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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

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CEMA AGRICULTURAL IMPORTERS, EXPORTERS DISAGREE ON PRICES

Prague ZAHRANICNI OBCHOD in Czech No 1, 1984 pp 11-14

[Article by Petr Matejcek: "Setting Contractual Prices for Agricultural Products in Mutual Trade Among CEMA Member Countries"]

[Text] The task of providing countries of the world's socialist system with foodstuffs and other types of agricultural products constitutes one of the key problems that member countries try to deal with by combining and more economically utilizing their resources with the concurrently more active participation of economic instruments in the mechanism of mutual cooperation, particularly prices.

The importance of the role ascribed at present to prices in dealing with these tasks is made obvious by the many types of sessions and conferences, particularly the dealings of specialists within CEMA's Permanent Committee for Foreign Trade and CEMA's Permanent Committee for Agriculture, that took place in the course of the past decade. Problems of price setting and, consequently, also of setting contractual prices for agricultural products have, however, been the center of attention ever since the Ninth Plenum of CEMA in 1958, at which the general principles of price setting were approved. Since then, an extensive discussion has been waged, conducted primarily within and at the level of CEMA's Permanent Committee for Foreign Trade in the Preliminary Program for Improving the System of Foreign Trade Prices, particularly on methodological aspects. Part II/1, which was approved at the 69th Plenum of CEMA's Executive Council, examines the topic "Methods and Criteria for Taking Into Consideration Peculiarities of Agricultural Production in Setting Foreign Trade Prices," including seasonal variations in the exportation of agricultural and food products.

Even though the problems and questions involved are very topical and pressing and, as such, also receive the requisite amount of attention, only rarely do we find references in technical literature that are explicitly devoted to a theoretical revelation of the essence of international value-creating and price-fixing processes relevant to agricultural products and an analysis of their peculiarities.

Differing Standpoints

The entire period from the Ninth CEMA Plenum to the present has been characterized by a certain amount of honing and refining of viewpoints relative to the problems of setting contractual prices for agricultural products; it ought to be emphasized at the very outset that these discussions are based essentially on generally valid principles of price setting adopted at that very plenum. Of course, it stands to reason that, in view of the often very considerable differences in the soil and climatic conditions of agricultural production between individual CEMA countries and specific peculiarities of agricultural production itself that become reflected in the structure, nature and the results achieved by agriculture as the latter's varying position in the structure of the national economy and, consequently, also external economic relations, individual countries used to assume varying standpoints with regard to the problem of setting contractual prices for agricultural products. Over the course of many years two groups came into being, representing different viewpoints, which include countries that take an identical or very similar standpoint in relation to these problems resulting from the above-mentioned facts. If, on the one hand, confrontation of varying standpoints regarding the character and implementation of individual principles and setting of contractual prices for agricultural products themselves does not merely constitute a theoretical problem, but actually reflects an effort to establish a certain market position, the actual meeting point for supply and demand on the world's socialist market, then, on the other hand, this activity is not and never has been motivated by an effort to gain certain one-sided advantages, but by an effort to have the set contractual prices reflect as accurately as possible the social costs of labor in agricultural production and, in so doing, contribute to (and simultaneously stimulate) the efficient allocation of the international division of labor to the most suitable production conditions. This objectively follows from the economic nature of the mutually exchanging (trading) socialist territorial entities.[1] Thus, this does not, and even could not, involve some antagonistic contradiction, but an entirely objective dialectical antithesis which results in constant progress--improvement--of price setting. Without its existence, this would be impossible.

As part of these standpoints regarding the character, extent and manner of applying the individual principles of price setting (leading quite naturally to not only a certain character and level of contractual prices of agricultural products, but representing at the same time a specifically derived manifestation of the peculiarities of agriculture, or its international price-setting processes), it seemed necessary to monitor the promotion of peculiarities or problems of setting contractual prices for agricultural products along two lines.

1. Differences "Specifically" Due to Supply and Demand

The possibility of dividing CEMA members into primary importers (USSR, CSSR, GDR and Poland) and primary exporters (Bulgaria, Hungary, Romania) of agricultural products and their identification with the sides of supply and demand proved of key importance in acquiring certain findings in this first line.

In this context, i.e., in dividing member countries into the two specified groups, it is necessary to emphasize the term "primary." None of the countries mentioned is an exclusive exporter or an exclusive importer of agricultural products. Thus, even the contrast between opposed attitudes is actually not so sharp. In many cases (even though paradoxically) they do come to an agreement through their awareness of the fact that by pushing through higher (or lower) levels of contractual prices the given country, though primarily an exporter, could inflict "damage" on itself by the need to import certain agricultural products. On the world's socialist market, i.e., in mutual trade transactions, all socialist countries act among themselves as social entities, public owners of all the mutually traded commodities. In no case do they act outwardly as a sum of proprietors, even though the still incomplete development of the market mechanism of the world's socialist market (and with it its categories) as well as the actual method implementing business transactions through the so-called derived subjects (e.g., PZO [foreign trade enterprise]) would be conducive to such an assumption. The objective is always the final economic effect that can be attained through mutual trade and/or international socialist division of labor in general, and, what is more, the overall effect on the national economy. It is only through an increase or decrease in the latter that the socialist state as an entity, as any other entity, measures the "advantage offered" or "disadvantage posed" by each individual business transaction, i.e., also the contractual price level.

The Base of Contractual Prices

The basic principle for setting contractual prices on the world's socialist market are the so-called world prices.[2] The finding, adoption and application of the requisite base of contractual prices encounters many specific problems in relation to agricultural products, because of the many peculiarities of their production and exchange.

In principle it can be said that "importers" fully subscribe to the principles of contractual price setting from the Ninth CEMA Plenum and that they consequently agree in their viewpoints on the inevitability of using world prices as the basis for contractual prices also in the case of agricultural and food products. According to them, they are not only an adequate (objective) expression of the international level of socially necessary costs of labor in this production sphere, but, at the same time, include its basic peculiarities (i.e., particularly the effects of climatic and other natural conditions, risks, duration of the production cycle, seasonal fluctuations, quality, etc.) through the individual elements (channels) of the pricing mechanism.[3] It is argued against a basis of contractual prices so interpreted that world prices do not reflect the specific peculiarities attendant to the agricultural production of CEMA member countries and, to a certain extent, differ from average world conditions,[4] and that the point is whether or not there is any justification for forming contractual prices of agricultural products on the basis of two criteria, i.e., international costs of their production that find their expression in world prices, and national costs incurred in turning out the same product within CEMA member countries. In the opinion of representatives of the "importing" group, such a dual approach to

formulating the contractual prices of agricultural products that comprises two value bases does not appear to be justified, because such intermingling would lead to the loss of an objective criterion for determining a justified price level. In this context it must be pointed out that theoretical advocacy of world prices has had and still has its purely pragmatic reasons in the fact that world prices are usually at a lower level than the so-called regional prices (e.g., prices of the common agricultural market of EEC member countries).

It cannot be alleged that the group of exporting countries (particularly Bulgaria and Romania) is advocating an entirely different position in regard to the basis of contractual prices. The difference is constituted by the fact that they put territorial limits on the selection of world prices which they specify in closer detail in the sense that they are starting to look for higher value levels and ultimately come up with the proposal of using the so-called regional prices, used in trade among EEC member countries, for determining contractual prices. In their opinion, regional prices are maximally oriented toward the average cost of producing commodities under identical or very similar geographical (soil/climatic) conditions and are not subject to discriminatory customs, price and tax policies that to a considerable degree deform (particularly by lowering) the level of world prices. The lower level of world prices which does not attain the level of the socially requisite utilization of labor on an international scale is, according to them, occasioned by two factors. On the one hand, the level of export prices for agricultural production is partially determined by production in developing countries, based not only on favorable natural conditions but also on very cheap manpower, and on the other hand, in advanced capitalist countries the effectiveness of production is very high and, moreover, exports are strongly subsidized. Contract prices based on such world prices would fail to adequately stimulate the development of production for exports.[5]

Thus, deformation, instability, and primarily the low level of world prices provide a reason for exporters of agricultural production among CEMA member countries to modify the basis of contractual prices. Assessment of the feasibility of using regional prices proposed by them as the basis for contractual prices is not a simple matter. Consideration must be given, among other things, to the internal complexity of the price-setting system of the Common Market. After all, its components are base (orientational, control), intervention (procurement), protectionist (threshold) prices. And even these prices fluctuate, depending on movements of world prices. Constant changes are occurring also in the amount of various compensatory surcharges and deductions to and from these prices which are very hard not only to detect but even to estimate, because they too depend on the movement of world prices. These regional markets, just as markets of individual countries, are limited by an extensive system of tariff barriers which means that the so-called regional prices cannot directly serve as a basis for either buying or for selling. Thus, their adoption and application as a basis for contractual prices does not fully meet the principle of mutual advantage. The latter presupposes the question of where CEMA member countries would do their buying if they were not buying within their community. Such a possibility for turning

to foreign markets realistically exists only in relation to the world market, which is marked by free commerce and nonexistence of any administrative limitations.

The problems of determining the character of the adopted price basis is further complicated by additional peculiarities, stemming again from the specific nature of agricultural products. The latter also changes the relative priority in determining the so-called representative markets. This is so because in the case of agricultural goods accessibility, i.e., geographical proximity of the market, is of considerably greater significance because agricultural products are in many cases very demanding on transportation, be it through their volume (cereals) or properties (fruit, vegetables).

Thus, the selection of a representative market is very closely connected with the selection of representative world prices and vice versa. However, the problems relevant to the determination of an adequate price base of contractual prices do not end with a decision to use these or other world prices and/or representative markets. The reason is that the former are directly connected to the problems of further processing the thus adopted base. In this respect, there is considerably greater agreement between importers and exporters. They agree that in each case the prices involved are of a differing socioeconomic substance that must be further stripped of various cyclical, inflationary and speculative "deposits" left by state or regional measures, etc., to allow them to function as they should. This problem is compounded by selection of the so-called basic period, however, because a correct determination of the latter is much more complicated and sensitive in the case of agricultural products than of other, e.g., industrial products and, at the same time, is now actually the only method of "direct" purging applicable in price setting as currently practiced.

The group of exporting countries is pointing out the differences in the nature of the reproductive cycle of individual agricultural products (primary), particularly the varying duration of its progress, which exceeds that of food products. Thus, they propose to prolong it to more than 5 years for primary products while leaving it the same for food products as for any other commodities, i.e., a 5-year period.

On the other hand, importers (with the exception of the USSR) are of the opinion that there is no basic problem involved and that (in the interest of uniform principles of price setting) it is possible to retain the character of a sliding 5-year period for agricultural products, regardless of whether they are primary products or products of advanced stages of processing.

These standpoints are opposed primarily by some specialists from the USSR who are for cutting down the base period from 5 years to two with simultaneous use of a sliding base. However, for all practical purposes, this would mean trading at contractual prices close to actual world prices. They argue for accelerating the rate of movement of world prices and creating more favorable conditions for using an equally long time period for raw materials and agricultural products on the one hand, and for machinery and equipment on the

other, whereby the specification (or determination) of longer time series is understandably more difficult.

While a uniform method for determining the base period (sliding 5-year) is in use at present, it can be envisioned that selection of the length, stability or nature of mobility of the base period in relation to the problems of purging it of the deposits will obviously form the main topic of continued development of contractual prices in the coming years as well. This is borne out, among other things, also by the fact that ever since early 1982 the talk has been more and more in favor of the advantages offered by a 5-year stabilization of the price base in comparison to the sliding base principle. The reason for these discussions was probably provided by the recent developments in world prices of crude oil and of raw materials in general.

The problems of setting contractual prices for agricultural products are complex and it is truly difficult to come up with principles for negotiation that take into consideration the special nature of the utilitarian values of agricultural products, their properties, methods of production and trading, affecting their supply and demand by their importance, type, chronological frame, quality, etc. However, their lack of adequacy leads to serious consequences that become reflected in the degree and quality of meeting the needs of the populace of the world's entire socialist system, because they can and often do lead to the formulation of contractual prices that do not sufficiently stimulate the group of exporting countries to develop the agricultural production for which they possess the most suitable natural conditions, and to export their products to individual member countries. This applies primarily to the problem of a low level of contractual prices that is to be done away with by additional pricing instruments, tools of fiscal and credit policy, e.g., by creating various incentive, supportive or orientational funds, preferential credits via prolonged repayment times, lower interest rates, and even by direct investment aid by countries interested in importing the given agricultural products.

The position taken by individual countries in relation to these problems is not quite uniform, but also not polarized enough to permit a closer categorization.

Incentive Prices

One of the most important pricing tools that should help solve the problem of stimulating production and mutually exchanging agricultural products among CEMA member countries are the so-called incentive prices. It can be said that the significance and importance of incentive prices to the continued development of production and mutual trade in agricultural products is acknowledged by all member countries. However, importers (USSR, CSSR, GDR, Poland) emphasize that they must be used only exceptionally and with precise specification of the types of merchandise and precise delineation of the period in which they will be offered. Thus, they are considered to be of a temporary nature.

Exporters (Bulgaria, Hungary, Romania and Cuba) take a somewhat more open attitude toward incentive prices, even though it must be noted that the differences are not all that great. They maintain that if contractual prices fail to stimulate production and exports, particularly of agricultural products of which there is a shortage, then it becomes necessary to negotiate incentive surcharges and generate incentive prices that exceed world prices, because only in this way can they cover the costs of production and implementation, provide for export profitability and create normal conditions for economic renewal. This should apply primarily to chronically short products of great importance, such as fruits, vegetables, meat products, cereals, etc.

Thus, incentive prices should be a supplementary means of increasing the level of contractual prices as opposed to world prices, and in this way stimulate not only the production of agricultural and food products, but also their exportation to other member countries. Of course, whether or not incentive prices are actually accomplishing all this or could accomplish it--since they are not used on a mass scale--remains an unresolved problem.

2. Differences Constituted by Deficient Mediation of International (Contractual) Prices

It stands to reason that principles of price setting cannot be built merely on theoretical, model concepts, but must respect and be at the same time a reflection of the definite reality of the corresponding, i.e., the world's socialist market. They must reflect the specific historical stage of development of its mechanism and thereby the conditioned development of the corresponding categories. If the world's socialist market still is not fully integrated and multifaceted, a market which facilitates the setting of its own ideal international prices through the balance of planned supply and demand of all traded commodities, as envisioned in its theoretical derivation, then the impact will also "afflict" contractual prices of other types of commodities. Its imperfection will become most clearly evident specifically in the case of contractual prices of agricultural products, in the sense that they will much more conspicuously reflect the peculiarities of their production and exchange.

Due to its splintering in the system of bilateral and, moreover, territorially determined markets and their mutual dissatisfaction, the world socialist market cannot be expected to come up with foreign trade contractual prices that would represent an objective (and, as such, also uniform) economic criterion for the socially necessary costs of labor in the community of CEMA member countries, in the entire world socialist system or even on a worldwide scale. As yet not even individual price-setting factors can function as integral elements in the world's socialist market; therefore, its economic relation and nature of setting contractual prices and agricultural products is still clearly determined by the existence and determinative effect of the world's capitalist market, or its prices, when contractual prices are in fact merely derived from world prices. The imperfectly set contractual prices reflect far more vividly the peculiarities of production and exchange of agricultural products.

The first possibility through which these peculiarities enter into the setting of contractual prices for agricultural commodities is represented by internal offering prices. The lower and differing level of economic utilization of agricultural natural conditions in individual socialist countries, which becomes manifested in peculiarities of its price fixing and value-forming processes, is necessarily reflected in the varying mechanisms of their internal price setting and the relevant price levels--wholesale and retail. These offering prices,[6] resulting from such internal assessment, are then quite obviously marked very strongly by the conditions attendant to production of the given utilitarian value (and its peculiarities), and merely bilateral exchange relations could hardly be expected to become their objective regulator and/or corrector. However, there necessarily occurs a mutual separation between both price levels--internal and foreign trade--which usually points in a negative direction for exporters of agricultural commodities. This negative deviation is the expression of one of the important peculiarities relevant to agricultural production. An analysis of agriculture and of its position in the national economy shows that the attainment of an identical economic level (i.e., identical level of economic utilization of available natural conditions by a given territorial entity) with a higher share of agricultural production as a rule calls for a substantially higher level of economic conditions that serve as input. Thus, for this reason those socialist countries characterized by a higher share of agricultural production in the structure of their national economy, or of the generated product (USP or national income), have quite objectively (and, it can be said, for objective historical reasons) at their disposal lower magnitudes of the general economic level. Bulgaria, Hungary and Romania[7] still find themselves in this position among the European CEMA member countries. These are the countries we included above among the so-called primary exporters of agricultural products on the world's socialist market. This discordance in price levels--which works out to the detriment of exporting countries and which at the same time is actually an expression of the economic attainment of a better material position of entities with a higher economic level, i.e., importers of agricultural commodities--must necessarily reduce the role of contractual prices of agricultural products as an objective criterion for the effective allocation of social labor. This became manifested, among other things, also in differing viewpoints with regard to the individual principles of joint price setting, interpretation of their provisions, implementation of specific principles, and also efforts and trends relative to their modifications and changes.

The second possibility through which peculiarities can enter into the setting of contractual prices of agricultural products is world prices. Their level depends far more on the peculiarities of supply and demand on the market dealing with agricultural products, or on production and consumption, i.e., magnitudes which have a much more specific bearing on agricultural products, than on any other type of production. In this context it is very important to recognize this specific role of world prices as the prices of the world's capitalist markets in the mechanism of the setting of contractual prices for agricultural products and their potential share in the resolution of the problems (peculiarities) of their generation. It is quite obvious that while the application of this cardinal price setting principle even to this type

of commodities shows internal contradictions, it adequately reflects the conditions of internal limitation and inadequate development of the world's socialist market and its elements. The fact remains that a great majority of problems and peculiarities attendant to setting contractual prices for agricultural products can take the form of partial modifications, improvements of this base and its other relevant aspects, such as its purging, determining the length and nature of the base period, selection of representative markets, price documentation, etc. If, at the same time, this principle is applied systematically and only as a uniform criterion for viable production conditions and if it becomes possible to find an optimum measure of "identification" of contractual prices with world prices, then world prices can also become an effective tool for the stimulation and development of agricultural production and mutual trading of its products. However, it must always be kept in mind that as long as prices are constituted by entirely differing market balances, they cannot become the tools for planned optimization of exports and imports or for establishing a balance between production and consumption on the world's socialist market, much less become expressive of such balance. This constitutes not only the substance of that contradiction, but also a limitation on the use of world prices as the basis for contractual prices and a limit which must be transcended. Overcoming this contradiciton between contractual prices as a specific (derived) form of the world price on the world's socialist market and a price set consciously (through planning) will call for not only substantially higher but also less divergent quantitative expressions of the economic level of individual CEMA member countries, a substantially higher degree of development of the world's socialist market and, understandably, the qualitative change derived therefrom in the very principles of setting contractual prices.

All of these facts necessarily modify not only the position and mutual interaction of supply and demand on the world's socialist market, but also the application of the individual principles of price setting and, thus, also the character of promoting their peculiarities in contractual prices of agricultural commodities. The peculiarities of their setting then become manifested rather as peculiarities resulting from the interdependence of price setting on both world markets, the socialist and the capitalist market, and not as an adequate reaction to the specific character of agricultural utilitarian value and the peculiarities of its production and exchange resulting therefrom.

Conclusion

We have endeavored to call attention not only to selected problems or peculiarities connected with setting contractual prices for agricultural products, but also to point out the two basic directions in which, in our opinion, it will become necessary to concentrate efforts toward overcoming them, because in their essence they obstruct an accelerated rate of development of mutual trade in agricultural and food products, or international agroindustrial integration in general, with all the consequences becoming reflected in the degree to which these basic social needs are met. This should involve a systematic introduction and improvement of the principle of a uniform "objective" base

of contractual prices, i.e., world prices, and, primarily, improved forms of international planning designed systematically to span the lack of interconnection between the mechanism of the market and the mechanism of planning. Between the two directions or efforts there is a certain contradiction which, on the one hand, in its own way makes price setting in mutual trading among CEMA member countries more difficult or complicated but, on the other hand, is an important factor which at the current level of development of their international economic relations provides for constant changes and, thus, for development.

We have shown that world prices, be they interpreted in the concept of "importers" or "exporters," are more or less reflective of the actual market balance, but that of an entirely antithetical world capitalist market. After all, it again involves more or less realistic price figures that, however, reflect all the peculiarities of setting prices for agricultural products obscured by all the characteristics of their formation which accrue to their "capitalist" essence, and substance, which they reflect. Continued development of this cardinal principle of setting contractual prices must factually involve finding an optimum measure of identification between contractual prices with world prices of agricultural products, so that world prices exert their effects truly and only as an expression of a high level of productivity of labor, of intensity and efficiency of production of individual agricultural products, application of R&D elements, their continuously improving quality, etc., and thus generate identical trends in the agricultural production of all CEMA member countries, particularly those that enjoy the most favorable natural conditions for it.

If a basic changeover is to occur from contractual prices of agricultural products to prices determined by planning, then it will also become necessary to implement the corresponding basic changes in the forms and contents of international coordination as the basic form of international planning. Continued development in this area will have to be implemented both in the area of improving the conditions of internal planning in individual socialist countries as well as their conscious incorporation into their mutual international economic relations. It will have to involve the attainment of comprehensive coordination of all phases of the process of economic renewal within the framework of medium- and long-term plans, systematic application of the identity of material and value proportions as well as various chronological horizons. The basis for achieving such an advance in the application of joint planning is systematic versatility, a higher level of interlinkage and intensity of mutual relations among individual socialist countries, or CEMA members. The constantly improving capability of socialist territorial entities as subjects of international socialist economic relations to ever more systematically (and more precisely) anticipate and also influence the development of production conditions themselves, objectively determining the socially necessary costs of labor for production of the requisite amount of agricultural products ahead of time, ex ante, through planning as well as the result of continuous improvement of the methods and forms of international coordination will at the same time create the requisite conditions for a changeover of contractual prices and of agricultural products into an active tool for the planned optimization of production on an international scale.

The character of contractual prices will not undergo any changes in spite of the continuing potential for implementation of part of the supply and demand for agricultural commodities on an alternate, i.e., the world capitalist market. The latter, or its prices, assuming the nature and level of world prices, will merely modify the conditions for the attainment of a balance by means of their effects on the level of the international socially necessary costs of labor--international value--or international (contractual) prices of the world socialist market.

The measure of their effect will be given primarily by the extent of mutual trade and the relative difference between the two quantities as international and worldwide. However, there is nothing to prevent world prices from becoming a part of this balance--to the extent that they do not prevent its attainment in the first place--under the above assumptions. In the same way, they cannot become its substance. Thus, the mutual effects of price quantities of both systems change neither the substance nor the relative independence of the price setting processes of both world markets--the capitalist and the socialist market. International prices of the world's socialist market will always reflect--despite the changes that will occur in their level thanks to the contemplated effect of world prices--qualitatively entirely different relationships, specific export relationships, or this community's balance between production and consumption. The attainment and maintenance of this balance will of course be much more difficult in view of the full spontaneity and, consequently, more difficult movements in world prices.

Thus, world prices actually do have the potential to become an instrument for spanning the gap between the market mechanism and the planning mechanism. However, it must be emphasized once more that a mere mechanical adoption of world prices is not enough, because this involves the very complicated process of their integration, incorporation into the price setting system of the world socialist market (and, thus, also its balance) which, however, must also include corresponding forms for the effects of these prices on the conditions constituting the internal balance of the individual socialist countries.

Therefore, the process of improving the contractual prices of agricultural commodities must take place as a complicated and comprehensive process of generating an entire system of contractual prices of all commodities that are subject to mutual exchange.

FOOTNOTES

1. With regard to the objective necessity for promoting a common objective, see particularly the latest studies of the team of Josef Tauchman about the international economic effect as well as the relative and absolute optimal conditions of production. For example: Tauchman, J. and Z. Chalupsky: "International Socialist Economic Integration. Introduction Into Theory." Prague, Academia 1981; Tauchman, J. et al.: "The Category of International Socialist Economic Relation," Prague, Academia 1983; Tauchman, J.: "Theory of Comparative Costs and International Socialist Division of Labor," POLITICKA EKONOMIE 8/83, etc.

2. Whenever we make use of the term "world prices" we have in mind the existential form of a world value which fully reflects the specific socio-productive relations within which it originated, in other words, a world (international) price of a very specific world capitalist market.

3. Compare: Mitrofanova, N. M.: "Prices in the Economic Cooperation Mechanism of CEMA Member Countries," Moscow, Nauka, 1978.

   Samraj, J.: "Problems of Planned Utilization of World Prices in Foreign Trade of the USSR With CEMA Member Countries," ZAHRANICNI OBCHOD 6/1979.

   Hlavacek, O.: "Contractual Prices in Mutual Trade Among CEMA Member Countries," ZAHRANICNI OBCHOD 1/1980.

   Agenda from the Conference on Methods and Criteria for Giving Due Consideration to Peculiarities of Agricultural Production in the Determination of Foreign Prices, Including Seasonal Prices in Exporting Agricultural Production, Moscow 1976.

4. Compare: Arojo, J.: "The Market for Agricultural Products Within CEMA--State, Outlooks, Developmental Factors," in: "Teoreticheskie problemy mirovogo sotsialisticheskogo rynka [Theoretical Problems of the World Socialist Market], Part I.," International Institute for Economic Problems of the World Socialist System," Moscow 1975.

5. See, e.g.: Kondela, V., Tasken, G. and G. Sabo: "Trends in Trading and Prices of Vegetables and Fruits, and of Certain Food Industry Products on International Markets."

   Miku, D.: "Criteria for Determining a Representative World Market for Establishing Foreign Trade Prices for Agricultural and Food Industry Production in Relations Among CEMA Member Countries."

   Agenda of the International Conference on the Theoretical and Methodological Problems of Improving the Prices of Agricultural and Food Industry Production in Trading Among CEMA Member Countries, Sofia 1974.

6. They naturally reflect not only the internal value relationships of production of the given utilitarian value (of an agricultural product), but the production of all commodities turned out nationwide as well as the value relationships of their international exchange.

7. For entirely different reasons, Poland is now ranked only after these countries.

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CSO: 2400/275

BRIEFS

TRAWLERS FOR USSR--On 19 March another ship built for a Soviet shipowner was sent down the slipway into the water at the C-1 hull assembly division of the Lenin Shipyard in Gdansk. This was the 27th combination trawler-processing plant weighing 1,800 DWT in a series of 29 ordered by the USSR. [Text] [Warsaw ZYCIE WARSZAWY in Polish 20 Mar 84 p 2]

PIPELINE GEAR FOR USSR--The "Bumar" Construction Machinery Factory in Torun is gaining a monopoly hold over the manufacture of some unique kinds of equipment. This includes self-propelled line-up clamps, that is, specially designed machines which line up and mate the section interfaces of huge pipes with diameters of up to 1.5 meters. The advantage of these machines is that their engines are driven by their "own" DC power source; the whole machine unit is designed to operate in tandem with a welding machine. A factory pilot lot of these line-up clamps--which have already been run through engineering tests in Moscow--are now being subjected to performance efficiency testing under operational conditions in the USSR, where a final decision will be made as to the full suitability of these devices. If the machinery passes these tests, "Bumar" will put them into full-scale porduction in three model versions designed to handle pipes of varying diameters. The number of machines to be produced will depend on the number of domestic and foreign orders placed. It is well-known, however, that the Soviet Union ought to wind up being the most important customer for these machines. [Text] [Warsaw ZYCIE WARSZAWY in Polish 6 Apr 84 p 4]

CSO: 2600/870

REPORT ON ECONOMIC DEVELOPMENT IN 1983

Sofia STATISTICHESKI IZVESTIYA in Bulgarian No 4, 1984 pp III-X

[Introductory portion of the publication, including General Remarks, Table of Contents, and a summary of economic development during 1983]

[Excerpts] General Remarks

The present publication appears once every 3 months and contains annual, quarterly, and monthly statistical data on basic indices which characterize the socioeconomic development of the Bulgarian People's Republic.

The program of statistical information includes 11 divisions:

Basic data for national economic growth

Living standard of the population

Labor

Capital investments

Industry

Agriculture

Transportation

Communications

Domestic trade and prices

Tourism

Foreign trade

The data for all the branches are arranged by organizational structure and composition of the enterprises for the corresponding period. The national economic branches and the industrial branches are examined according to the classification for the branches of the national economy endorsed by Decree No 309 of 19 April 1979. The indices for cost are published according to prices for the corresponding year. The annual indices for industrial and agricultural production, for capital investments, for turnover and prices, for foreign trade commodity exchange and monthly indices for cost are calculated according to comparable prices. The annual indices are calculated using 1970 as the base period, and those for a period shorter than 1 year--on the basis of the corresponding period in the preceding year. The data for communal services for the population are given according to retail prices on 1 January 1982.

The data for incomes and expenditures of households are ascertained according to representative observation of household budgets.

The data for 1983 are preliminary and will be refined in following issues.

Explanation of abbreviations and Symbols

0 -- less than half of the corresponding unit of measure used

– -- no instance

. -- data lacking

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National Economic Growth During 1983

During the third year of the Eighth 5-Year Plan, the national economy grew intensively at a steady rate. The living standard of the population was raised; its increasing material, social, and spiritual needs were more fully met.

National income increased by 3 percent compared to 1982. The social productivity of labor in economic organizations and enterprises from the non-agricultural branches grew by 5 percent during 1983, compared to 1982. As a result of the intensification of all material production, almost 90 percent of the growth in national income was obtained because of the increased social productivity of labor.

The mechanization and automation of production continued. Some 520 mechanized and automated production lines have been implemented, and 236 sectors, workshops, and production facilities have been equipped with complex mechanization and automation.

Industry

Compared to 1982, the growth in general industrial production of state and cooperative industrial enterprises increased by 4.5 percent. The highest growth was achieved by state enterprises for electrotechnical and electronics industry--14.6 percent; machine building and metal processing industry--8.5 percent; chemical and rubber industry--7.4 percent; production of electric and thermal energy--5.6 percent. The following okrugs achieved growth above the average for the country: Sofia and Stara Zagora--8.6 percent; Shumen--7.6 percent; Razgrad--7.5 percent; Plovdiv--6.6 percent; Kurdzhali--6.5 percent; Lovech--6.0 percent; Ruse--5.8 percent, etc. In comparison with 1982, the production of a number of basic industrial products was increased: electric energy by 5.4 percent; coal by 0.7 percent; steel by 9.3 percent; trucks by 12.6 percent; electric motors by 2.8 percent; power transformers by 2.6 percent; electric trucks by 8.5 percent; motor trucks by 22.0 percent; televisions by 3.3 percent; nitrogen fertilizers by 5.2 percent; cement by 0.5 percent; paper by 1.5 percent; furniture by 1.2 percent; woolen fabrics by 6.0 percent; silk fabrics by 2.7 percent; meat by 3.9 percent; cheese by 8.2 percent; vegetable food oils by 12.5 percent; tobacco products by 3.6 percent.

The productivity of labor per capita of industrial production personnel in state industrial enterprises grew by 3.6 percent, compared to 1982. The greatest increases were in the enterprises in the electrotechnical and electronics industry--11.0 percent; the chemical and rubber industry--6.2 percent; and the machine building and metal processing industry--5.8 percent.

Capital Investments

Building and improving the material and technical foundations of the national economy continued throughout the year. The greatest portion of capital investments, about 73 percent, was directed to the branches of material production. Capital investments worth 6,672,000,000 leva were invested. Compared to 1982, an increase of 1.9 percent was achieved. Of the total amount of capital investments, 35.4 percent were used for modernization and reconstruction. Fixed assets worth 6,077,000,000 leva were put into operation.

Agriculture

During 1983, a number of additional measures were taken for cultivating crops, protecting plants, and irrigating. During the spring months, 2,000,000 decares of wheat and barley were irrigated. This area is over 5 times larger than the irrigated area of fall crops during recent years. Over 1 million tons of active chemical fertilizers were delivered, which provided for the basic fertilizing and feeding of agricultural crops. The supply of machines and tractors for agricultural organizations was augmented by approximately 2,900 new tractors and over 1,700 combines. Compared to 1982, the production of fruit from orchards, of early vegetables and some fodder crops, increased. The total amount of production of livestock grew by 3 percent, compared to 1982. The number of sheep increased by 2.4 percent, and of poultry by 2.2 percent. The productivity of agricultural livestock improved. The average

milk yield from a cow fed with fodder increased by 7.4 percent, and the average egg yield from chickens by 2.0 percent. More milk was produced--5.2 percent, and more eggs--8.9 percent. Good results were achieved in the procurement of agricultural products. In comparison with 1982, more of the following were purchased: meat--3.5 percent; milk--5.8 percent; eggs--8.5 percent.

Transport and Communications

Economic organizations for general use transport carried 1.6 percent more loads and 2.1 percent more passengers, in comparison with 1982.

Vehicular transport carried 2.3 percent more loads; seaborne transport--3.7 percent more; civil air transport--3.6 percent more.

The activity toward improving transport services for the population continued. In addition to the scheduled transport carriers, railroad trains were increased by a total of over 10,000 passenger cars, and an additional 725 passenger trains and 891,000 bus trips were made available. Compared to 1982, railroad transport carried 1.4 percent more passengers; vehicular transport--2.2 percent more passengers; and civil air transport--5.8 percent more passengers.

The productivity, measured by the average wage of operator-workers, increased by 1.1 percent in railroad transport, by 1.7 percent in vehicular transport, by 0.1 percent in river transport, and by 1.5 percent in civil air transport.

Income from communication services was 9.4 percent higher than in 1982.

The postal network was expanded by 37 new post, telegraph, and telephone of offices, 27 of which are in villages. A total of 141,559 new telephone hookups were made, 106,696 of which were for domestic use. A total of 219 new telex machines were put into service. Eight radio transmitting stations, 18 radio broadcasting towers, and 62 television relay transmitters were put into use.

Living Standard and Domestic Trade

The living standard of the population continued to improve during the year. Net incomes increased by 2.8 percent, compared to 1982.

The average monthly wage of workers and agricultural employees reached 202 leva and grew by 2.4 percent, compared to 1982. In the state and cooperative industrial enterprises, the average monthly wage increased by 2.4 percent; in construction by 0.9 percent; in railway transport by 1.2 percent; in vehicular transport by 0.9 percent; in seaborne transport by 3.6 percent; and in civil air transport by 3.2 percent.

Communal services were further improved. The total amount of services rendered to the population grew by 10.1 percent, compared to 1982. Services

per capita of the population for maintenance and repair of small appliances grew by 15.7 percent; for maintenance and repair of motor vehicles by 15.7 percent; for maintenance and repair of radio and television sets by 17.2 percent; for metal processing services by 23.4 percent; furniture and woodworking services by 11.7 percent; for maintenance and repair of elevators by 9.8 percent; textile and knitwear services by 4.0 percent; tailoring services by 10.5 percent; shoes and leather-haberdashery services by 11.5 percent; dry cleaning by 13.5 percent; laundering by 11.2 percent, etc. Transportation and communication services for the population are now better. Passenger seats in buses, trolleybuses, and streetcars were increased by 5.7 percent for every 10,000 people, and telephones installed for private use by 12.8 percent for every 1,000 people.

More and more varied goods were provided for the domestic market. The amount of new, luxury, and delicatessen products continued to grow, in addition to other goods which are sought at markets.

Retail commodity turnover reached 13,800,000,000 leva and increased by 3.8 percent, in comparison with 1982, and in public catering alone by 4.4 percent. There were increases in a number of food and non-food goods sold: rice increased by 1.6 percent; meat products by 3.3 percent; vegetable food oils by 0.5 percent; sugar by 4.2 percent; milk by 2.4 percent; butter by 2.9 percent; eggs by 4.5 percent; fresh fruit by 6.0 percent; jams, jellies, and preserves by 8.5 percent; tailored items by 2.1 percent; knitwear by 8.6 percent; underwear by 0.6 percent; shoes by 4.0 percent; sewing machines by 12.6 percent, etc.

Foreign Trade

The participation of the Bulgarian People's Republic in the international division of labor was expanded. Integrated relations with socialist countries and most especially with the USSR were strengthened. During 1983, the foreign trade commodity exchange reached 23,700,000,000 leva in foreign currency, which is 8.3 percent higher than in 1982. Commodity exchange with CEMA member countries grew by 14.3 percent. This accounts for 75.2 percent of the total amount exported and 78.9 percent of the total amount imported to the Bulgarian People's Republic.

Compared to 1982, 12.2 more machines and equipment designed for production, 6.0 percent more chemical products, fertilizers, and rubber, 18.8 percent more building materials and parts, etc., were exported. The machines and equipment designed for production which were exported account for 48.4 percent of the total amount exported. More of the following goods were imported during 1983: fuel, mineral materials and metals, raw materials and their processed products (excluding foodstuffs), industrial goods, goods for public consumption (non-food merchandise).

12334
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MORE SOPHISTICATED SOFTWARE FOR PRODUCTION CONTROL NEEDED

East Berlin WIRTSCHAFTSWISSENSCHAFT in German No 3 Mar 84 pp 393-406

/Article by E. Richter, Institute for Political Economy of Socialism, Academy for Social Sciences, under CC SED: "On the Exploitation of Software for Increasing the Performance of the GDR's National Economy"/

/Text/ In the present international situation, the consistent increase in the economic performance of our national economy is a condition for our continuing to be able to successfully realize the internal and external objectives of the Tenth SED Congress. "Political stability, economic dynamism, the smooth flowing pursuit of the unity of economic and social policy for the welfare of the people are of crucial importance for our contribution to the preservation of peace."[1]

To achieve further advances by way of prdominantly intensively expanded reproduction, it is necessary primarily to exploit the potentials of scientific-technological progress. The Tenth SED Congress described its speed-up as the "key to the increase in the efficacy of qualitative factors for economic growth."[2]

The exceptionally rapid advance of the scientific-technological revolution introduced various new factors to the development of productive forces. At the Secenth SED CC Plenum, Erich Honecker described as follows the significance of the development of productive forces for the economic progress of our national economy: "All facts indicate that the tempestuous development of the productive forces is going to continue. The economic status of our country and the people's standard of living will ultimately be decided by the way we manage to keep step with this development."[3]

Typical for the new factors of the development of productive forces--such as microelectronics, modern processing chemistry or biotechnology--is the dialectical connection between their all-round exploitation and intensively expanded reproduction. On the one hand the most comprehensive possible exploitation of this new scientific-technological knowledge is of the utmost importance for the advance of intensification, on the other the steadily rising level of the national economy's intensification offers increasingly better starting positions for the efficiency effects of the new factors of the development of productive forces.

Microelectronics allow the data processing equipment access to all sectors of social labor. This makes increasingly evident the effects of the data processing equipment and the software linked to it as new elements in the development of the

productive forces. It is therefore necessary--from the politico-economic and the economic-political aspect--to theoretically examine the economic characteristics of software and draw practical conclusions therefrom for the development of efficiency reserves in the GDR's national economy.

Software and its Importance for the Greater Efficiency of Social Labor

The efficiency of social labor as the concentrated reflection of the developmental standard of the productive forces is affected by qualitatively new impulses in the scientific-technical revolution. The type of work equipment now characteristic for the scientific-technological revolution just as once was the type of work equipment of the industrial revolution described by Marx, results in a new quality of the material-technical basis of social production. This type of work equipment is distinguished by the fact that it does not merely consist of "the machine causing movement, the transmission mechanism, ultimately the machine tool,"[4] but that one more link, the data processing machine, is integrated in it. The modern type of equipment combines the function of the technological processing of the object being worked on, the conversion of the energy affecting the object being worked on, and the function of data processing, for instance in industrial robots or CNC /computer numerical control/ machine tools.

The crucial generic feature of this data processing machine (hardware) is the fact that its ability to function depends on programs (software). These organize the work process within the data processing machine and assist its operation (system oriented software) on the one hand, and on the other carry out problem solving for the user (problem oriented software).

To characterize software in the system of productive forces, the first important statement is this: Software is an indispensable element of the work equipment that provides the decisive basis for a higher standard of labor productivity in the scientific-technological revolution.

Some work equipment even in the past was not directly controlled by human beings for part of its operations; instead it received instructions by certain mechanisms in the machine. The Jacquard weaving machine, for example, first marketed in 1805, is probably one of the first programmed machines. Of course these were specific mechanisms inside the machines, processing specific and simple data for the realization of their technological function. The present data processing machine, by contrast, has universal nature. It is able to handle the most varied programs. At the present time, electronic data processing equipment (EDVA) enjoys the greatest universality. Data processing equipment linked to machines in direct manufacture has only that extent of universality that makes sense with respect to the available technology and the current capacity of the machines. The fact that data processing equipment offers far more possibilities than are now being used in direct manufacture, indicates the revolutionary developments ahead of us.

The information processing machine can be used by itself and as a complex technical system (coupling the EDVA with automatic drafting devices, display terminals, long-distance data transmission equipment and other EDVA's) but also as part of traditional as well as completely novel work equipment. That is the reason for the many varied possibilities for using data processing equipment.

Information, information processing and communication processes are gaining importance in all areas of social labor. Arising therefrom is a growing demand for automating as many as possible of these processes with the aim of raising the efficiency of social labor. It is a particular concern to transfer to technical equipment certain information processing functions in direct material technology. The accurate and rapid handling of the many functions of adjustment and control arising in the course of advancing automation is simply too much for human capacity. To conquer the limits of human capacity by data processing corresponds not only to the objective development trends of the productive forces in the scientific-technological revolution but also to the needs of intensively expanded reproduction. Man as the main productive force is gradually enabled by the steady automation of data processing to achieve greater availability in the reproduction process. Many operations in the work process--especially those involving a great deal of monotony or linked with mental routine--are gradually losing their direct ties with live labor. Man is beginning to emerge from direct manufacture. Man is successively ceasing to be an appendix, a part of the machine. That is a decisive source for comprehensive revolutionary measures of rationalization, intensification, a higher standard of product quality or work results and new working conditions.

Crucial for the efficacy of this technique, the quality of the data processing to be automated, is the dialectic cooperation of hardware and software. This applies to the standard of development of the hardware and to the quality and volume of the available software. Ever since its emergence, software has not just been serving to make the hardware usable but to contribute to its increasingly efficient utilization. In dialectic unity, hardware and software have progressed significantly to this day, and just as that we describe as hardware has undergone substantial change, the concept of software, too, has experienced crucial alterations.

By software we nowadays understand the programs for the utilization of data processing equipment. It also includes all methods, processes and ancillary equipment for the development and utilization of programs, such as computer languages, software technologies and documentations. Software has a material existence, may be stored in data bank, many be reproduced at will and may be reworked several times. Speaking of software, we need to distinguish between

-- System or machine oriented programs (such as operational systems or basic software for micro computers). They organize the work process inside the data processing machine and help its operation;

-- Problem-oriented programs, including the standard user programs with a large extent of general applicability. They are instructions for the machine to operate so as to realize a problem of application. These programs have the utmost importance for the efficient use of the hardware in the reproduction process.

How should we appraise the influence of problem-oriented software on the reproduction process generally and on its stages in particular at this time, and what potential efficiency reserves are discernible?

In the conditions of the scientific-technological revolution, the preparations for production and circulation hold an increasing share of the total reproduction time, and the quality of the technical-technological and organizational preparation

largely determines the efficiency of the production process. "Major advances in the intensification of our production always start on the drawing board and in the laboratory."[5] The opportunities for improving the production preparatory stages with the aid of data processing techniques have been used ever since the first computers were taken into service. For the past 20 years or so, problem-oriented software has turned out to be useful for the more efficient organization of the production preparatory stages. Let me cite an example from structural engineering planning:

Since 1970 the program system "technological line for one-floor multipurpose buildings" (EMZG) is being used for planning structural engineering. Up to now it has helped plan around 1 million square meters of floor space, involving an increase in the planning output of 200 percent compared with catalogue planning and 250 percent compared with the average planning output in industrial construction. The 5-year period of return calculated in 1973 for the development costs of the technological line was in fact realized. The reason for the efficacy of the program system--still in operation--is the overall responsibility of the South Construction and Assembly Combine for the production of one-floor multipurpose buildings. Linked to this is the combine's interest in the constant servicing and up-to-dateness of the program system as well as the high rate of subsequent use.[6]

We find similar examples in all sectors of the national economy for the efficient use of problem-oriented software in the production preparatory stages, especially with regard to design, planning and technology as well as in scientific work.

The availability of up-to-date equipment on the job, for example with respect to design and technology jobs, facilitates the work in CAD /computer aided design/. This makes for a considerably shorter drafting and design stage, while the quality of the end product is much better. The prerequisite is, on the one hand, up-to-date software with respect, in particular, to variability and the embodiment of an advanced scientific standard of the work achieved with it. On the other this work method challenges designers and technologists to maintain a thorough preparation for the dialogue with the computer, advanced specialized skills, an efficient work style and awareness of the programs' capacity.

In contrast to the production preparatory processes, we still lack comprehensive experiences of direct control and adjustment of production with the help of data processing equipment. The traditional electronic data processing facilities were not suitable for economic utilization in controlling and adjusting production, because the cost of their equipment turned out to be unduly great. Microelectronics permit data processing equipment as part and parcel of the work equipment, as information processing systems for controlling and adjusting production, for linking the data of production with central EDVA's and data banks of the enterprise or combine, even including long-distance data transmission. In many sectors of the national economy the automation of production thus becomes a possibility. At the Seventh SED CC Plenum, Erich Honecker expressed this as follows in reference to machine construction in the GDR: "The transition to comprehensive automation is proceeding in increasing breadth."[7]

CAD/CAM /computer aided manufacturing/--the combination of computerized production preparation and control--offers an up-to-date hardware and software conception.

CAD/CAM, though, can be realized only gradually and mainly in new investments, due in particular to the large cost of the equipment. The general environment is now more significant for the efficiency of the software for the automation of production than it was for earlier software applications--beginning with the overall strategy of the branches of industry via the quality of the technological and organizational solutions to the volume of output of the machines.

Problem-oriented software solutions are also increasingly important for the efficiency of circulation processes. We already have positive experiences of programs on the rational organization of delivery and transportation relations in the transport of freight and in passenger transport at enterprise, combine, regional and national level.

There are many possible starting points for the further intensification of the processes of accumulation by problem-oriented software. "Reproduction on an expanded basis, accumulation--initially only as the quantitative expansion of production, using more capital in the same production conditions--now offers itself at a certain point qualitatively also as the greater fruitfulness of conditions."[8] We must consider the utilization of the available potential in the meaning of simple reproduction from this aspect, in particular.

The subsequent equipment of available machines and plant with electronic controls and the appropriate software has an important role in the reconstruction and modernization, the conversion of entire technological processes.

We have many opportunities for employing problem-oriented software in the preparation and realization of investments, for example the study of variants, cost comparisons and supervision of the progress of the investment. Within the reproduction process, software is increasingly turning into a basic tool of management and planning, gains importance for the economy managing superstructure and, consequently, the organization and further development of socialist production conditions. Software to assist planning, management and balancing facilitates new steps toward the perfection of central direction in the manner of the economy's movement. Important efficiency effects on the social reproduction process must also be recognized in the fact that, with the help of software, the requirements of the economic laws of socialism are more widely discernible, more visible in their complex interrelations, and can therefore be used more resolutely. Comprehensive industry-wide and national overall calculations including optimalization and variant calculations are impossible without software. Software is thus an important means to increasingly better respond to the economic law of the planned proportional development of the national economy, especially in the conditions of the growing dynamism of all processes in the further organization of the developed socialist society.

Most programs in the GDR were hitherto developed to assist management, especially in the field of accounting, because here offered the processing of mass data. These programs serve the rationalization of routine work but do not effect any fundamental changes in the traditional work process. Such problem-oriented programs as were developed in all sectors of the national economy, account for about half the software available in the GDR. We now increasingly need programs

facilitating a more profound understanding of the economic interrelations in the implementation of complex scientific-technical innovation processes.

The processing of mass data and the automation of routine jobs are also very important with regard to the automation of data processing in production preparation and scientific work. However, the focus here is on software solutions which are not achievable with traditional working methods and equipment. In addition to rationalization effects, such problem solutions display a new quality of scientific-technical and organizational solutions. It is precisely this type of software that requires resolute further development.

To develop the efficiency potential of software in the reproduction process implies an extension of its fields of application and thereby in many sectors of social labor to advance and intensify scientific-technological progress. In this context it is important efficiently to utilize the available stock of hardware as well as new hardware systems.

The study of the dialectic of hardware and software provides access to the more profound understanding of the software's efficiency effects on the automation of data processing.

On the Dialectic of Hardware and Software

In the course of the development of computer technology, the demands on the most user friendly and effective man-machine communication have steadily increased. The type of communication realized at the beginning of the development of computer technology--to transmit or process data by way of the direct human operation of the equipment, for example the operation of relays--was replaced by programs which translate and transmit human commands in machine legible form, facilitate the operation of the EDVA's and adjust the work process in the computer. On top of all this, the programs do this with greater precision and very much faster than had been achieved by direct human operation.

Four generations of computers represent the development of data processing equipment with respect to which we may state concerning the dialectic collaboration of hardware and software, that not only the potential of the hardware makes demands on the software--qualitatively as well as quantitatively as regards the utilization of the hardware's capacity--, software demands on the further development of the hardware are also emerging quite clearly. The two parties thus influence one another. In the interest of the benefits to be reaped from the first computer generation, for example, it was found to be a priority concern to pass from the complicated and numerical coding (subject to error) of the machine language to problem-oriented program languages. This means that precisely defined words rather than figures release certain commands. Required on the part of the hardware is an interpreter (translator, transmitter) who translates these command words into machine codes. This became a component of second generation computers. Compared with the second generation, third generation hardware offers faster computing speeds, greater storage capacity and many peripheral devices such as drafting devices and display terminals and printers. In this generation, system-oriented software realized the automatic control of the plant and error diagnoses for serious software errors. This increased

efficiency of hardware and software offers the user many advantages, especially by the expansion of the fields and opportunities for the use of software. Problem-oriented software solutions acquire greater weight for the efficient organization of labor processes at the user.

As regards the future, we may conclude from the earlier development of the dialectical unity of hardware and software that the importance of software is bound to rise with the growing user friendliness, capacity, miniaturization and availability of this equipment. This is the second significant statement in the description of software as a productive force. Indeed software is increasingly included in economic considerations by the fact that its share in the total costs of hardware/software has risen to an exceptional extent and already amounts to about 60 percent in the GDR also.

Elements in the costs of software are mainly represented by the deployment of live and embodied labor needed for its development. The following are the most important reasons for the steadily rising costs of software compared with hardware:

-- In the past 30 years the development of hardware progressed at an impressive rate and has internationally achieved its temporary apex by the industrial mass production of technologically mature and cheap microelectronics. The storage capacity of electronic components, for example, doubled about every 2 years to the present 64 k bit. At the same time costs per operational unit declined sharply. While, since 1960, the extent of integration at the leading microelectronic producers in capitalist countries increased by a factor of 2,000, costs per operational unit declined by a factor of 1,000.[9] Computer costs, related to 1 million operations per second, declined to a 20th in the past 10 years (1970-1980) in the CEMA countries, too. In the subsequent 10 years (1980-1990), another drop in costs to roughly one fifth may be expected.[10]

-- While hardware production proceeds on an industrialized basis and by technologies subject to constant perfection, software largely continues to be developed by predominantly individual methods. Consequently software development is an extremely expensive process. At its inception is the draft of the algorithm, a procedure requiring demanding and usually lengthy work. This is followed by the translation of the algorithm to the program--programming. The next stage is that of testing and correction. The work described above costs wages and, in the test stage, involves computation costs which may be very high indeed for new and complex algorithms, because the test stage is apt to last for quite a long time. By utilizing interactive jobs (coupling the job with EDVA) for software development, the test stage is intensified. Each program requires a documentation allowing the user to familiarize himself with the program and indispensable to the developer. The preparation of quality-appropriate documentation proceeds mainly manually and is also very expensive. Programs documenting themselves incur higher development costs but lower the cost of documentation. Nor are the costs incurred in servicing, maintaining and updating the programs inconsiderable. The same applies to the development of program languages and software technologies. We are now seeing the rudiments of more rational methods for the production of software by the use of special computers and devices. The first steps are the utilization of standardized mandatory methods and technologies for software production

such as software technologies and software architecture on the basis of building blocks with defined intersections and uniform languages. This already allows us to counter the continuing rise in the costs of software.

-- Hardware enjoying great universality is equipped with a plethora of software products. This involves great demands on the quantitative aspect of software production. However, even the microcomputers used as part and parcel of working equipment and with little universality, still require extensive programs. Just these microcomputers will soon be used with increasing frequency, and programming experiences are far less extensive in their case than the software development for EDVA with major universality. That is why we may not underestimate the quantitative aspect of software development. In view of the steadily rising availability of data processing equipment, it will be possible and imperative in future also to develop constantly new fields of application for software. We must therefore expect rising quantitative demands on software development.

-- The development of software requires appropriately qualified manpower, efficient development collectives able to draft the algorithms of the programs according to the specifics of the labor process to be automated, to carry out programming, testing and to document the programs and handle servicing and rationalization. It takes a good deal of time and money to train these cadres.

-- Ensuring the quality of software products is a problem still unsolved at international level also. Program testing is very complicated and takes an inordinate amount of time as a result of the individual development methods.

-- The low rates of the subsequent use of software frequently reduce its efficiency. The high development costs of software would need to be compensated by correspondingly high subsequent use rates--including the export of software products. Particularly important in this context are program libraries and data banks, such as the program and planning center of the Robotron Combine VEB.

When we analyze these causes of the rising cost of software by comparison with hardware from the aspect of the future, we note two contrary trends:

Cost reductions are achieved by purposeful measures for the rational development and use of software, such as the mandatory introduction of software technologies, software architectures with building block systems, uniform languages and measures for the realization of profitable subsequent use rates, the compatibility of devices and others. Some developments regarding future hardware solutions, such as the "intelligent computers," in which parts of the software become components of the hardware, would certainly also tend to lower the cost of software production. We cannot expect, however, that this trend will disproportionally drive up the cost of the hardware.

The demand for problem-oriented software for the automation of more and more work processes in the reproduction process is rising sharply at the present time. The automation of work processes is indeed the really decisive function of data processing equipment. This objective is served by the further development of hardware, which is proceeding at a sometimes breathtaking speed. As the logical result of the

dialectic development of hardware and software we must expect the integration of predominantly system-oriented software and data bank software in hardware for the automatic control and increasing user friendliness of the equipment.

Despite the notable advances in the utilization of EDV facilities in the GDR by the perfection of system-oriented software, ongoing developments in software and hardware both are required to achieve increasingly complete utilization by problem programs. This, however, involves yet another rise in software costs. We must therefore assume that costs of software as against hardware are certainly not going to drop. Not even if the above mentioned cost reducing factors take effect. The trend toward the growing importance of software continues. It is caused primarily by the expansion of the applications of software.

Hardware and software as a dialectic unit depend on one another. Data processing equipment cannot operate without programs. At the same time the use of software always depends on the availability of compatible equipment, and the highest quality software cannot be efficiently developed and used unless the appropriate hardware is available. This reciprocal dependence also holds good for their study further development.

Nevertheless software is relatively independent within this dialectic unity of hardware and software. That is the first basic perception with regard to software as a productive force. Devices and equipment cannot be used at all without the system-oriented software developed for them and the problem-oriented user programs. Software, on the other hand, does not absolutely depend on hardware. System-oriented software may be interchanged in the same equipment, and problem-oriented software is usable in compatible equipment. This relative independence of software achieves even greater significance by a current developmental trend: Programs and equipment must be developed to such a degree of coordination as to guarantee the transferability of a program from one device to another (portability). This includes transferability from one computer generation to the next. In this context the development of software consonant with standardized principles is just as important as the reciprocal compatibility of the devices.

It is this relative independence of software that makes it possible to rationally draft programs, use the programs multivalently and export software. It includes important efficiency potentials of the software. The quality and also the quantity of the available programs decisively affect the efficiency of the use and utilization of the hardware and the economic potential contained in it. The more mature the equipment, the greater the influence of the software on the results achieved with it. It thus depends mainly on the software to what effect the hardware is being utilized. Software emerges ever more clearly as the essential efficiency-determining element for the emerging new type of automated work equipment and the increase in the capacity of the material-technical base of the national economy, that is imperative for the further organization of the developed socialist society.

In order increasingly well to utilize the effects of software as an element of the development of the productive forces in the GDR national economy, it is necessary to devote special attention to the cost reducing factors for the development and use of software. Especially important in this context is the development of software on the basis of the division of labor. At the present time, system-oriented

software is developed by the hardware manufacturer and problem-oriented software mainly by the user, in other words combines, enterprises and research facilities of industry. This involves many expenses and duplicate developments, resulting in poor productivity in the development of software. Considering the growing demand for problem programs, we must review whether the establishment of specialized software development agencies for the respective industry might not offer better opportunities for the rational development of software. This procedure would also encourage the application of standard solutions and considerably facilitate the exchange of experiences between the various software producers. At the same time we would make sure that the users have the specific knowledge needed to handle the problem solutions. Such an organization of software development in the GDR might also promote the use of standard programs beyond the respective field, by equipping standard programs with defined intersections for connection to user specific program parts.

The growing demand for software in the entire reproduction process has both quantitative and qualitative effects on cadre requirements. In the case of automation projects for direct manufacture, for instance, we get a demand for software for the following applications especially:

1. Software for the operation of the total automation system (organizational solution),

2. Software for the automation of information processes in the planning, management and supervision of production,

3. Software for the production preparatory stages (CAD),

4. Software for the production control of the direct manufacturing process as well as for the control of auxiliary and ancillary processes (CAM),

5. Software for products equipped with microelectronics.

To do justice to the quantitative need for software specialists, we need to expand the potential of software specialists and, at least, the establishment of software groups in the combines. The greater qualitative demands on the development and use of software require the perfection of the most varied types of training and further education, beginning with counseling at school about the system of professional education and further education, going on to college training and including further educational measures by social organizations such as the Chamber of Technology. It is not only necessary to improve the training of the direct software specialists; professional groups in contact with the automation of information processes must also be equipped with the required knowledge. Consonant with the speed of scientific advances in the field of microelectronics and its application, permanent further education is definitely gaining in importance as against the traditional once-and-for-all education. This requires an up-to-date system of training and further education as well as a completely new attitude to the job and the acquisition of skills by the working people.

The specific feature of software--to be the product of highly skilled live labor--strengthens the subjective factor wherever software is developed and used--even though the automated production process is objectified thereby. The subjective

efforts of man in the production process undergo a qualitative change and are generally raised. Linked with this is the gradual change in the nature of work for many groups of professions. "Hundreds of thousands of people are thereby given an opportunity to do their job in other and more favorable conditions and to derive greater satisfaction from it. That, comrades, is of great and basic importance. It brings us closer to the accomplishment of one of the main tasks of communist construction--the conquest of the existing differences between physical and intellectual labor."[11]

Rising Demands on the Quality of Software

As software is the product of highly skilled live labor, the rise in software output and the improvement of its quality depend on the qualifications and efficiency of the cadres employed in this field. The source of the greatest possible efficacy of software in the social reproduction process is represented by their ability to analyze a process in its complex interrelations, perceive it consonant with the requirements of the economic laws of socialism and the tasks for the implementation of the economic strategy of the SED for the 1980's, and translate this perception into a language corresponding to the circumstances of data processing technology. In addition, the efficacy of software depends mainly on the following factors:

-- The volume of the existing programs and the areas of application developed thereby,

-- The quality of the software, including standardized programs,

-- The extent of the subsequent use of the programs,

-- The application of rational production methods to software, and

-- The utilization of hardware by efficient programs.

The best possible quality of the problem-oriented software is an essential source of a considerably better cost/profit ratio in the respective processes. This, in turn, presumes the rational organization of these processes. That is particularly important for direct production control.

Software for direct production control currently accounts for the smallest part of GDR software stocks. The use of this software is indivisibly linked to the automation of entire production sections or the use of automatic manufacturing cells. The demand for such programs will rise significantly following the broad employment of robots and the emergence of low operation sectors in future direct manufacture. Rising analogously is the demand for cadres able to draw up and handle such programs.

Data processing equipment available on the job changes the job processes in direct production just as in scientific-technical work. The work on computer and display terminal assisted jobs for design and technology, including access to data banks, factilitates considerable advances in the quality of the results as well as in productivity. The software programs for these jobs are coupled with entirely new job processes corresponding to the scientific-technical standard of this equipment.

Moreover, the original "manual" processes would be an anachronism, because they offer no opportunities at all for exploiting the capacity of the equipment. With the help of software, for example, it is possible to use algorithms either not at all realizable "manually" or only at an unjustifiable cost in terms of man hours. The finite element method in statics, for example, has been known for a relatively long time, but it was not possible to widely use it because it requires an enormous amount of calculations (the solution of a large number of sets of equations, for example). This method of calculation supplies very accurate results, permitting considerable conservation of materials in construction statics, for instance. The use of this research and development method in the problem-oriented software of construction statics frees the planner from time consuming calculations and allows him to turn his attention to creative tasks.

In this connection, too, we clearly note that the higher quality of software is far better able to provide the key to the better utilization of data processing for the greater efficiency of production than greater efficiency of the hardware. That is why the improvement of software quality is deserving of the proper attention in every combine. Efforts to achieve a better quality of software, reflected ultimately in a significant improvement in labor productivity and the efficiency of social reproduction, is the most important step toward countering the trend of the rising cost of software and compensate it by greater efficacy.

The development of high-quality software is a complex process, challenging the scientific comprehension of the processes, and it requires extensive prerequisites from the aspect, especially, of the programming languages, software technologies and software architecture. At the same time it is imperative to concentrate the development potential on selected key points. The definition of criteria for the appraisal of the quality of software products must taken into account the most varied aspects and always be appropriate to the needs of the user. The following aspects may be considered important quality criteria for software:

-- The high scientific-technical and technological-organization standard of programs and algorithms,

-- The accessibility of the rational computerized realization of the algorithms and the user friendly input and output of the objectives and results,

-- Consideration in the documentation for the needs of the developer and user.

Another aspect in the appraisal of program quality is its amenability to testing. An untested program or one not amenable to testing is often without value for the user. From these facts we may deduce a basic conclusion for software production: From the aspect of the quality of a software product, what matters is not originality but the accuracy of the solution and its accessability.

Compared with the testing of other products, quality control of software displays some special features. First of all the problem solution as such needs to be tested. These problem solutions are usually of a scientific, technical and technological nature and distinguished by the specific features of the respective work process. Also to be tested is the computerized realization of the problem solution.

This also includes the tracing of formal transfer errors. Unfortunately any reviews are still made more difficult by the fact that software is the product of intellectual-creative work. Each problem analyst, each programmer and each development collective has its "own handwriting" quite capable of affecting and even impairing the programs' amenability to tests.

This necessary multiplicity of control work indicates that many textual or formal errors may occur in drafting the programs--even when this is done with the help of computers. Program testing and the constant work with the programs so as to correct the mistakes arising or to take new circumstances into account, is an important additional task for the improvement of program quality.

The following steps in direction of qualitatively valuable software are indicated for the GDR national economy:

The obligatory utilization of standardized technologies in the meaning of software technologies not only facilitates the quality control of software products, it improves their compatibility with other programs and makes possible a greater adjustment to user specific requirements. This produces important prerequisites for better subsequent use rates.

Just as important is a standardized linguistic concept, guaranteeing portability for both the microcomputer systems and the ESER /uniform electronic data processing system--used in CEMA/ equipment and taking into account the specific features of the respective reproduction process while meeting the challenging demands on user friendliness. The work with modules and program building blocks, amenable to coupling by standardized software architectures with defined crossovers, is another step to be taken by our national economy toward high-quality software and the greatest possible efficiency of its production.

Software is an indispensable element of the new productive forces to be mastered by our socialist national economy for the benefit of the people. To exploit all its potential and apply the most rational methods for its production requires us also to draw on the experiences of the Soviet Union and other socialist countries. Coordinated hardware development including peripheral devices and the coordination of future work on software products will guarantee a favorable cost/profit ratio for the CEMA member countries in this field also.

Socialist cooperation and the benefits of socialist planning ensure that this new element of the productive forces will also be resolutely used in the interest of the rising material and cultural living standards of the people. "Socialist planning based on Marxist-Leninist principles allows us to adopt challenging economic objectives and realize them consistently. It is able to flexibly respond to new circumstances and is a well proven tool in a situation of exacerbated class conflict."[12]

First steps toward the growing efficacy of the work in the field of software are represented by the inclusion of all user programs in central data banks, the priority development of software technologies, building blocks and architectures for multiple use, the speed-up in the standardization of these procedures and methods,

and a clearly defined sharing of responsibility for the rational production of software between manufacturers and users of the equipment on the one hand and the corresponding scientific institutions on the other.

FOOTNOTES

1. "7. Tagung des Zentralkomitees der SED, E. Honecker, 'In Kampferfuellter Zeit Setzen wir den Bewaehrten Kurs des X. Parteitages fuer Frieden und Sozialismus Erfolgreich Fort'" /Seventh SED CC Plenum, E.Honecker, "At a Time of Struggle We Are Successfully Continuing to Pursue the Proven Line of the Tenth Party Congress for Peace and Socialism/, Dietz Verlag, Berlin 1983, p 23.

2. "Direktive des X. Parteitages der SED zum Fuenfjahrplan fuer die Entwicklung der Volkswirtschaft der DDR in den Jahren 1981 bis 1985, Berichterstatter: W. Stoph" /Tenth SED Congress Directive on the Five-Year Plan for the Development of the GDR National Economy 1981-1985, Reporter: W. Stoph/, Dietz Verlag, Berlin 1981, p 18.

3. "Seventh SED CC Plenum," as before, p 29.

4. K. Marx/F. Engels, Collected Works, Dietz Verlag, Berlin 195601968, Vol 23, p 393.

5. "3. Tagung des Zentralkomitees der SED, 'Aus dem Bericht des Politburos an die 3. Tagung des Zentralkomitees der SED,' Berichterstatter: E. Honecker" /Third SED CC Plenum, "From the Politburo Report to the Third SED CC Plenum," Reporter: E. Honecker/ Dietz Verlag, Berlin 1981, p 31.

6. See H. Eckenfeld, "EDP in the Construction Industry--Development and Profit," DIE WIRTSCHAFT, No 4/1982, p 12.

7. "Seventh SED CC Plenum," as before, p 28.

8. H. Koziolek/H. Stuerz, "On the Intensification of the Circulation Process in the Theory of Karl Marx," WIRTSCHAFTSWISSENSCHAFT, No 3/1983, p 331.

9. See I. Schubert, "Microelectronics--Opportunity for the Future," Special issue of TECHNISCHE RUNDSCHAU, Berne, No 45/1978, p 3.

10. See M.J. Rakowskij, "Results and Perspective of Computer Equipment," RECHENTECHNIK/DATENVERARBEITUNG, No 11/1982, p 5.

11. Yuri Andropov's speech at the CPSU CC Plenum, NEUES DEUTSCHLAND, 16 June 1983, p 7.

12. G. Mittag, "Our Party's Economic Strategy--Reflection of the Dynamic Development of the Socialist Planned Economy," EINHEIT, No 9/1982, p 873.

11698
CSO: 2300/365

NEW FOREIGN CURRENCY LAW INTRODUCED

Warsaw ZYCIE WARSZAWY in Polish 24 Feb 84 p 3

[Article by jux: "What Is Changing?"]

[Text] On 31 March 1984, a new foreign currency law is coming into force. A new law, but for the majority of our readers the essence of the situation will not change very much. Such is the case because the innovation is based principally on the following: part of that which has been permitted to this moment -- indeed whichis still now permitted -- by either the minister of finance or by authorized organs is now permitted purely on the strength of the law itself.

So, as before, the overall prohibition against buying and selling foreign currency without special permission is in effect. But still, the new regulation clearly allows physical persons in Poland to possess foreign currency -- articles 10 and 11. If that foreign currency is foreign hard currency, it may be deposited in Polish foreign currency bank accounts -- article 12.

In the regulation valid up till now (article 20 of the foreign currency law of 28 March 1952), a similar prohibition had extended its sway over not only the buying and selling of foreign currency but also over its possession. Only the decree issued in 1956 by the minister of finance allowed, without special permission, domestic possession of either foreign money or gold and platinum not in the form of usable products. This overall loosening saw its further realization in 1970 when interest payments on foreign currency accounts were introduced in the banks. In this way, through the issuance of general permission, the minister of finance rescinded the general statutory prohibition. Thus article 20 (and article 21, its implementing article) of the old foreign currency law remained a regulation in name only.

But not just buying, selling and possessing foreign currency required special permission.

As stipulated by article 22 of the previous foreign currency law, a Pole holding foreign currency abroad needed special currency permission to dispose of personal and real property held abroad, as well as rights thereto (including the delegation of power of attorney to make acquisitions or purchases).

The new regulation clearly settles this question. Article 1 point 3 states that the law regulates, among other things, "the duty to report property of Polish nationals held abroad and the property of foreign nationals held in Poland as well as the duty of limiting some functions not constituting turnover of foreign currency." In the first instance, the duty lies with the owner (article 27, paragraph 1). In the second instance, however, it lies not only with the owner but with the person in whose possession or under whose control the given property is held (article 27, paragraph 2).

It is worthwhile adding that the content of the notification presented here is under protection. This is regulated by the rules for banking secrets (article 28).

The foreign currency regulations coming into force this spring are being issued along the lines both of a general granting of authority and the introduction of new obligations. For instance, foreigners are obligated to exchange foreign into Polish currency with the goal of covering the costs of their stays in Poland, or else must by some other method cover those costs. Until now such an obligation fell to citizens of other nations. Now, however, as a result of the law's regulations, this obligation has been extended to citizens of the Polish People's Republic who have permanent residence abroad.

Among other developments, it is necessary to refer to one change of a formal nature. Until now, the concept of Polish national vs foreigner has served for the concept of Polish foreign currency holder and "foreign" foreign currency holder. This we must remember insofar as there are still, on the strength of article 45, valid foreign currency permits issued on the basis of the old law operating within the limitations noted above.

In addition, the concepts of buying and selling foreign currency and of what constitutes foreign currency have been refined. We shall be writing about that in the coming issues of our column. We will also be illuminating problems voiced by our readers.

12512
CSO: 2600/790

MEASURES TO IMPROVE EXPORT OF CHEMICAL INDUSTRY PRODUCTS

Bucharest REVISTA ECONOMICA in Romanian No 9, 2 Mar 84 pp 8-9

/Article by Dr Constantin Lazar, Institute of World Economics: "The Coordinates of a Marketing Program for the Exportation of Chemical Products"; passages enclosed in slantlines printed in boldface/

> /Text/ We continue the discussion organized by REVISTA ECONOMICA regarding the way to concretely perform the tasks of restructuring the production and supply for exportation in a number of industrial fields and subbranches, in accordance with the current demands on the international markets and the specific position that our producers have regarding the production factors.
>
> Starting from the objectives of the Program Regarding the Improvement of the Technical and Qualitative Level of the Products, the Reduction of the Consumption of Raw Materials, Fuel and Energy and the Better Utilization of Raw Materials and Supplies in the 1983-1985 Period and up to 1990, the strategies for developing the exports in the machine-tool industry, the electronics industry and the clothing industry were analyzed (REVISTA ECONOMICA, Nos 44 and 50, 1983, and No 7, 1984). In this issue, we present the directions of restructuring that the marketing diagnosis indicates for the exportation of chemical products.

In accordance with the tasks mapped out by the 12th congress and the national conference of the party, the chemical industry will further undergo rapid development and diversification, of a nature to help to a growing degree both to meet the need for domestic consumption and to increase Romania's participation in the international division of labor.

The successes obtained thus far by Romanian chemistry, on both a domestic plane and a foreign plane, have had as a basis the essential contribution of national scientific research, which has managed to put at industry's disposal a wide range of original manufacturing technologies and procedures. At the same time, it can be judged that, in the process of the expansion and diversification of production and exportation, Romanian scientific research will further make a

decisive contribution. The more and more intense involvement of Romanian chemistry in the circuit of international economic exchanges will have to take into account the complex changes that are occurring in the world chemical industry, the extensive process of restructuring and relocation that is occurring in this field.

The Technological and Marketing Forecast

On a world level, the chemical industry has undoubtedly been one of the industrial branches most influenced by the explosive rise in the price of crude oil--of energy, in general--in the last decade; the impact has been twofold, since, on the one hand, crude oil represents the main source of raw materials for obtaining petrochemical products and, on the other hand, many of chemistry's subbranches are big consumers of energy. The rise in the price of crude oil has also entailed price increases for other raw materials necessary to the chemical industry, thus causing big changes in production costs. Up to the middle of the '70's, the fixed costs were predominant in the structure of the production expenses in the chemical industry as a whole, but after 1975, the variable costs began to have the higher percentage. In the judgment of the chairman of Dow Chemical Europe, the ratio between the fixed costs and the variable costs in the structure of the production expenses in the chemical industry has evolved as follows:

Costs	1960-1970	1970-1975	1975-1980
Fixed costs	75%	60%	40%
Variable costs	25%	40%	60%

For the products in the initial stages of processing, this reversal of the trend has been even more dramatic. From this viewpoint, the example of ethylene is very graphic. The percentage of raw materials and energy in the total production costs of ethylene rose from about 45 percent in 1973 to over 80 percent in 1980. In addition, it is noteworthy that, in the total production costs, raw materials and energy now represent 60-80 percent for the main types of fertilizer, 45-75 percent for plastic and over 50 percent for synthetic fibers.

The place that raw materials and energy have come to occupy in the structure of the production costs is causing their degree of accessibility and the price at which they are obtained to become decisive factors in competitiveness and thus in development, especially for basic petrochemical products, as well as for high-tonnage chemical products.

On the other hand, as a result of the explosive rise in the price of energy and raw materials and due to the slowdown in the rate of economic growth, in the capitalist countries the large majority of chemistry's subbranches--especially those producing high-tonnage basic products and intermediates--are in a predicament. A large reduction in the rate of growth of the demand or even an absolute reduction in it is occurring for many chemical products. For this reason, in many of chemistry's subbranches, the degree of utilization of the production capacities has dropped below the optimum limit; for example, in 1982, in

western Europe, the index of utilization of the production capacities was at about 65 percent for plastic and about 70 percent for synthetic fibers and synthetic rubber.

Under these conditions, an extensive process of restructuring and relocation, of a nature to lead to a new international division of labor in this field, is occurring in the world chemical industry. It is characterized by the speedup of the specialization of the industrialized countries in products with a high degree of processing and by the gradual growth of the percentage that the crude-oil-producing and -exporting countries have in the production and exportation of high-tonnage basic products, big consumers of energy and raw materials, such as petrochemical intermediates, fertilizer, plastic and synthetic threads and fibers.

The specialization in the subbranches of low-tonnage fine chemistry takes different forms from one country to another, depending on the traditions in developing some of these subbranches, on the available technologies and raw materials, on the scientific-research potential and so on. Thus, in 1982, drugs (15 percent), radioactive materials (5 percent), photosensitive products (5 percent) and pesticides (4.3 percent) had big percentages in England's total exportation of chemical products; we note the subgroups of drugs (10.6 percent), cosmetic products (7.4 percent) and radioactive materials (8.3 percent) in France's exportation; and the subgroups of drugs (8 percent), lacquers and paints (4 percent), dyes (3.7 percent) and pesticides (3 percent) are representative of the FRG's exportation. At the same time, it should be pointed out that products with a high degree of processing already have a cumulative percentage of over 20 percent in the West-European countries' exportation of chemical products, reaching 25.5 percent in the case of the FRG, 37 percent in the case of France and 40.2 percent in the case of England.

It is foreseen that, along with this expansion in specialization, the competition in the international trade in chemical products will increase as a result of the rise in the availability in a greater number of countries. This phenomenon will be specific especially for products with a low and medium degree of processing, both due to the fact that for them there already are big surpluses of production capacities in the developed countries and as an effect of the construction of new production capacities in the crude-oil-producing and -exporting countries in ensuing years.

The extensive process of diversification and renewal of the chemical industry's production requires the allocation of considerable material and human resources to the field of research. For example, the big West-German companies (Bayer, Hoechst and BASF /Badische Anilin und Soda Fabrik/) usually allocate funds representing 4-6 percent of the turnover for research and utilize 7-8 percent of the total number of employees in this activity. In the case of the firms specializing in low-tonnage chemistry (such as the Swiss ones), the research expenditures are even higher, usually exceeding 10 percent of the turnover. Moreover, in recent years one notes a rapid rise in research expenditures (in the top 15 American chemical companies they rose about 2-fold in the 1977-1982 period, from $986 million to $1.90 billion).

As objectives of the research, besides the concern for expanding the list of products and improving their quality, one's attention is caught by the long-term investigations of the Western firms, oriented toward diversifying the source of raw materials and introducing new technologies, with higher outputs and low consumptions of energy and raw materials. The research is aimed at increasing the flexibility and complexity of the procedures by improving the equipment, the methods of constructing it and the computerized control of the manufacturing process. It is felt that microelectronics offers to the chemical industry a big potential for development, comparable in effects to that provided a few decades ago by the switch to utilizing crude oil instead of coal as a raw material in this branch. At the same time, the spectacular growth of the role of biotechnology and genetic engineering, especially in the manufacture of complex products in the field of fine chemistry, is foreseen. Thus, it is estimated that, at the end of the century, these techniques will have a decisive role in manufacturing a wide range of drugs. In addition, one's attention is caught by the research aimed at achieving genetic mutations that permit the retention of atmospheric nitrogen by plants.

In the prospect of achieving nuclear fusion and thus obtaining an abundance of electric power, the Western firms are carrying out intense basic research in the field of electrochemistry. In this regard, one's attention is caught by the achievements in the field of obtaining acetylene from coal with the electric-arc procedure and by the research aimed at improving the water-electrolysis process for obtaining hydrogen.

The Product Strategy

As we noted, the development and diversification of the production in our chemical industry have also been reflected accordingly in our foreign trade in chemical products, making it possible to constantly increase exports and to reduce imports. Beginning in 1970, the balance of our foreign exchanges with chemical products has steadily become more positive, a situation encountered only in the case of countries with high economic potential.

In devising the strategy for further developing the production for exportation, it will be necessary to take into account the current situation of production and exportation, the research potential, and the trends that are foreseen in the international trade in chemical products in ensuing years.

In this regard, it is necessary, first, to /improve the macrostructure of the exports/, through /the priority development of the production of the subbranches of low-tonnage fine chemistry/, in such a way as to secure the continual growth of the percentage of the subgroups with a high degree of processing for exportation and to progressively reduce the percentage of the energy-intensive high-tonnage basic products (fertilizer, sodium products, carbide and so on). This orientation is dictated, on the one hand, by the fact that our country imports a certain amount of the needed crude oil (the main raw material) and, on the other hand, by the fact that, according to the specialized forecasts, the highest rates of growth in world imports will be registered precisely by the products with a high degree of processing.

Second, it is necessary to /improve the microstructure of the exports/, there having to be developed, within each subgroup of chemical products, the production for exportation /of the products and assortments for which high prices are obtained and which utilize raw materials and energy better/. To underscore the importance of this aspect, we mention a single example. The prices of high-tonnage plastic for general use (polyethylene, polystyrene and PVC /polyvinyl chloride/) are 2-4 times lower than the prices of special plastic for technical use. By including these assortments in our export list and, therefore, by achieving a structure of our exportation close to that in the developed countries, it would be possible to obtain a nearly 2-fold increase in the average export price. Similar examples can also be cited for other subgroups of organic and inorganic chemical products, including synthetic threads and fibers, drugs, cosmetics, pesticides and so on.

In the process of the practical implementation of the strategy of improving the structure of production, it is necessary, at the same time, to provide /stability to the exports in those groups and subgroups in which Romania specializes/ in the international division of labor. Under the conditions of the diversification of the products and the growth of the rate of renewal of them in the big exporting countries, the research, design and investment efforts are usually concentrated on a well-defined list of chemical products, which permits the establishment of relations with a large number of permanent clients, which are used to products having specific properties; in this way, the brands gain international prestige in the respective fields and thus a great capacity for penetration and a marked stability on the foreign markets.

The Marketing Strategy

Along with improving the structure of exportation according to groups and subgroups of products and defining the list of specific products that are to be promoted especially for exportation, it is necessary, taking into account the international commercial practice, to devote special attention to packaging and /displaying/ as attractively as possible those chemical products that constitute consumer goods.

Second, the promotion of these products for exportation must be preceded by /their technical approval according to the potential markets/, since the access of these products to the majority of the foreign markets is regulated by extremely precise and strict legislation.

Improvement in the efficiency of the exports of chemical products is directly influenced by the quality of /the technical assistance after sale/. (The big Western firms producing synthetic rubber, synthetic threads and fibers, lacquers and paints, dyes and so on give to the clients skilled service as regards the optimum processing parameters, the formulas for obtaining the different products and so on.)

At the same time, success in marketing on foreign markets, especially of the products with a high degree of processing that are meant for individual consumption, is conditioned by a sensible activity of /publicity/ and advertising through the mass media.

12105
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IMPACT OF USE OF COMPUTER IN AGRICULTURE

Bucharest REVISTA ECONOMICA in Romanian No 11, 16 Mar 84 pp 16-17

/Article by Dr Eng Valeriu Pescaru, director of the Information and Computer Center of the Ministry of Agriculture and the Food Industry: "The Impact of the Computer in Agriculture"; passages enclosed in slantlines printed in boldface/

/Text/ The current agrarian revolution in our country is laying qualitatively new tasks before the management, planning, organization and achievement of agricultural production, before the scientific research and technological design in this branch, with a view to continual growth in plant and animal production and in the economic efficiency of the activity. Their resolution entails a growing contribution of the high-performance methods and techniques of cybernetics and data processing.

The necessity of /widely and efficiently utilizing computers and systems of teletransmission and teleprocessing of data/ is caused by the very great volume of information that is generated and must be transmitted and processed with great promptness in order to be able to plan, forecast, organize and achieve production at a suitable level. The extreme complexity of the information system in agriculture--resulting from the mass character and the diversity of production (millions of hectares of agricultural area with tens of thousands of fields, tens of millions of production and breeding animals, thousands of state and cooperative units and millions of farms of the population, each particular one of which represents a certain category and a certain type of agricultural production capacity)--is accentuated by the specific character of agricultural production, in which the natural factors (the biological, chemical, physical, meteorological and other processes) have a direct influence on production--that is, on the actions taken by the human factor. In proportion as we know better and at the proper time the existence, evolution and influence of the natural factors, we will be able to utilize--or, if necessary, counteract--them more efficiently, through the skilled actions of the human factor, in order to obtain the maximum possible outputs; and this knowledge and the capacity (as regards speed and intensity) for action and interaction clearly depend on the properties of the information system, on its degree of cybernation, on the quality and performances of the data-processing system that represents its technical-material base.

An Extensive Field of Application of Mathematical Modeling and Automatic Data Processing

It is known that the highest efficiency in utilizing computers is attained precisely in the complex activities and fields, to solve whose problems man can no longer use the traditional methods and techniques. In this regard, we can give as an example the activities regarding: the economic and mathematical modeling for optimally substantiating the development plans and programs in agriculture; the optimum territorial distribution of these plans and programs, on all levels of the organizational structure; the management, scheduling and prompt supervision of plant and animal production; scientific research and technological design; and the up-to-date management of all categories of resources in agriculture.

Given that the maximum levels of cereal outputs can be obtained when the vegetable crops are placed in the most favorable areas and soils and when the sowing and harvesting (to refer just to these two agricultural activities) are done in the optimum periods, the important role that the contribution of /mathematical modeling/ and computers has in this regard clearly follows. In our country, we possess such models and programs for executing them by means of computers (some of these high-performance instruments have also been exported, and cybernetic specialists in our agriculture have also provided technical assistance for mastering and utilizing them in the countries that have imported them); it is necessary to expand to an even greater degree the utilization of such data-processing models and applications, which can help directly to obtain the increases in plant production given in the plans for development of agricultural production. /The expansion of the collaboration between the managements of the agricultural production units and technological and planning specialists/, on the one hand, /and the cyberneticians and data-processing experts in agriculture/, on the other hand, and the efforts to improve the information systems with a view to efficiently utilizing these models represent the sure ways to achieve /the optimum placement of vegetable crops/, the observance of crop rotations and /the reporting and prevention of losses/ of agricultural products. And since part of the production increases are due to optimization, and not to additional consumption of liquid fuel, it follows that the methods and techniques specific to cybernetics and data processing can also help to /reduce energy consumption/.

The necessity of /improving the information system in agriculture/ by widely utilizing computers is being underscored more and more frequently and it must be met on a national level. Thus, the proposals included in recent years in the programs for development of data processing in agriculture, with regard to achieving the data-processing system for unitary seed management (the creation of varieties and hybrids, the testing and approval of them, the records of the units' requests for seed, of the production and of the manner of filling these requests, the following of the behavior in production and so on), require as fast a solution as possible, including by achieving a /specialized data bank/. Animal production also has special requirements for utilizing data processing and other methods and techniques of cybernetics. In the scientific research in agriculture there are subjects for which the percentage of the data-collection and -processing operations can come to 60-70 percent of the total effort; the

"freeing" of the researchers from doing them and the providing of fast access to the necessary information by utilizing the computer will have as an effect a significant rise in potential, helping to obtain and utilize in production the results of the research.

Examples regarding the possibilities and advantages that the utilization of computers offers can be given from each subbranch and activity in agriculture, and the results obtained clearly confirm these advantages.

Over 80 data-processing units (computer offices and stations), staffed with about 1,200 data-processing experts (including about 55 percent operators), are now organized in agriculture; this potential is magnified by collaboration with the territorial centers for electronic data processing (in the network of the ICI /Central Institute for Data Processing/). Among the fields and matters in which data-processing systems and economic and mathematical models have already found applicability, it is possible to mention: the preparation and substantiation of the variants of the plant and animal production plans at a branch level and the assignment of the plan indicators according to counties; the optimum substantiation of the need for chemical and organic fertilizer and of its allocation according to counties and production units; prompt reports at a branch and county level regarding the performance of agricultural work and the deliveries for the state supply and the market supply; the optimization of feed rations; the selection and reproduction of animals and poultry; the allocation and supervision of the investment plan; the substantiation and supervision of the fulfillment of the plan for mixed-feed production; the substantiation of the need for liquid fuel according to the production technologies approved and the consumption rates set by means of the plan and the following of the compliance with the planned consumptions; and so on. Computers are being utilized more and more widely in the fields of land improvements and irrigation, of work of cadastral management of land resources, and of work of geodesy, cartography and territorial organization, in the activities of technical-material supply, in the economic research in the branch, in the scientific research and technological design in the fields of pedology and agricultural chemistry, in the creation of new varieties and hybrids of cereals and technical plants, in genetic engineering, and in the research and production institutes and stations in zootechny. Systems of electronic data processing are beginning to make their presence felt in the agricultural production units, the machine and tractor stations, the vegetable and fruit enterprises and so on. A growing concern of the county general directorates for agriculture and the food industry regarding the utilization of modern systems of electronic data processing is being registered, with the requests even exceeding significantly, in a number of counties, the existing potential.

Incompatibilities and Partial Solutions That Have Caused Gaps in Relation to the Needs

Although the results obtained thus far in utilizing computers in agriculture effectively support the matter of achieving at the higher qualitative parameters the activities in the fields in which they are applied, they still indicate a significant gap with regard to the current and long-term requirements, caused by the necessity of accentuating the qualitative aspects of the

activities in this branch in accordance with the tasks set by the party and state leadership and, personally, Comrade Nicolae Ceausescu.

This is also due to the fact that, in the previous period, for 8-9 years, there was not a clear conception of the way in which data-processing systems should be achieved and utilized in this extremely complex branch with activities that take on a marked specific character (such a conception--the guiding framework-draft--was worked out only in 1981-1982); agriculture depended to a very great degree on data-processing systems and applications devised outside of it, with a small contribution and involvement of the specialists and management factors in the agricultural units, which led to some incompatibilities with the concrete conditions in the branch, to difficulties in putting into operation and exploiting such data-processing systems and applications. Nor had the forms of organization of the data-processing units been conceived in such a way as to correspond as closely as possible to the concrete conditions in this branch (sometimes the forms practiced in industry were applied more or less mechanically). The types of equipment which were to be made and with which the agricultural units were to be equipped were analyzed and resolved insufficiently.

The fact that electronic (and even mechanical) data processing still has a quite modest presence precisely in the decisive area of agricultural production, and the slowness in introducing systems of data collection, transmission and processing into the basic units (the execution of data-processing applications achieved for the agricultural production units requires the transmission of the forms through representatives over tens of kilometers, to be processed--on high-capacity computers, which can be utilized more efficiently for highly complex work--in the computer centers in the county seats, with obvious negative implications regarding time consumption, promptness and costs), are hindering the freeing of the engineers, technicians and economists from the operations of recording, transcription and processing of data--this, in spite of the requirement that the specialists in agriculture perform their activity, not in offices, but in the technological process and operations, a task stressed repeatedly by Comrade Nicolae Ceausescu.

Measures, Requirements, Prospects Regarding the Growth of the Contribution of Data Processing to Raising the Volume and Economic Efficiency of Agricultural Production

This is why, in the last period, the management of the Ministry of Agriculture and the Food Industry, the Academy of Agricultural and Silvicultural Sciences, and the managements of the production units, of the technological design and research units and so on took steps that involve the expansion of the utilization of computers, the raising of its efficiency and the qualitatively higher use of the human potential and the technical capacities for data processing existing in the data-processing units in the branch.

To the same end, the National Council for Science and Technology initiated, last year, a special program for expanding data processing and speeding up the rate of integration of computers into the activities of scientific research, technological design, and production in agriculture.

Thus, in order to give more help to the agricultural production units (IAS's /state agricultural enterprises/, CAP's /agricultural production cooperatives/ and SMA's /agricultural mechanization stations/), /the organization of computer offices or stations that would be used jointly by several units/--and placed as close as possible to them (for example, in the combined agroindustrial councils)--/or exclusively by the units with a big volume of activity/ and, respectively, with big data-processing requirements, is planned. As soon as possible, together with the county general directorates for agriculture and the food industry, it is necessary to put the finishing touches on the program for organizing these units in each county and to turn to providing the necessary resources and setting them up. For the 1984-1985 period, two-three such data-processing units are proposed to be organized (also for the purpose of experimentation) in each county, or at least in the counties with a high percentage of agricultural production. The experience accumulated in recent years and the results obtained by the computer stations at the Mangalia IAS, the Nazarcea IAS and the Stefanesti-Arges Viticultural Research and Production Station, by the computer office in Ineu (organized by the Arad Territorial Center for Electronic Data Processing) and so on argue for the necessity of speeding up such actions.

/The equipment/ for data collection, transmission and processing /must have technical, economic and functional characteristics suited to the specific character of the activities in agriculture/ (with a high degree of dispersal over the territory) and /must provide promptness to the functioning of the information and decisionmaking systems/ of production. These requirements have also resulted from the experience of electronic data processing in programming the irrigation system in Constanta County, just as the experience of other units (for example, the Timis Combine for Pork Production and Industrialization) recommends the switch to making and utilizing /equipment for transmission along radio-communication lines and for automatic reception by the data-processing equipment/, along with further promoting teleprocessing systems using the existing telegraph and telephone lines.

It seems necessary for /the county general directorates for agriculture and the food industry to have under their subordination computer offices of their own/, specialized ones, which would collaborate closely with the other data-processing units in the agriculture of the respective county.

Big efforts must be made to apply measures that would secure /the reduction of the design and programming efforts/ required by the data-processing systems in agriculture, /the elimination of duplication/ in performing these activities, and /the achievement of as efficient data-processing systems as possible, which/--based on the utilization of high-performance methods and techniques and on collaboration between data-processing experts and the specialists in agriculture in designing and exploiting them--/would be characterized by high technical and functional performances and by minimum costs in operation and would be able to be generalized/ in as large a number of production units as possible.

The wide and efficient utilization of computers in agriculture also requires, at the same time--besides /the continual raising of the professional level of

the data-processing experts/--more thorough /knowledge, by the specialists and management personnel/ in the branch, /of the possibilities and advantages that these highly productive instruments offer/. The current curricula and analytic programs of the faculties and secondary schools with an agricultural makeup do not yet satisfy this requirement.

The steps and actions taken and the concentrated efforts of the managements of the units in agriculture, of the researchers, designers and specialists in production and of the data-processing experts will be able to give a strong stimulus to the better utilization of the essential contribution that data processing can and must make to fulfilling the complex tasks that stand before agriculture as a basic branch of the national economy, to attaining all the coordinates--technical, economic, organizational and social--of the new agrarian revolution.

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DEVELOPMENT OF RIVER TRANSPORT TO 1982

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[Article by Dr Mirko Dokic, professor: "Development to Date and Current Problems of Yugoslav River Transport"]

[Excerpt] The conclusions that can be drawn from the figures in the following table on developments in river transportation over the postwar period are as follows:

1. River transportation attained the volume of traffic it had in 1939 only in 1956.

2. The period from 1957 to 1965 was a period of somewhat more rapid development which recorded not only a substantial growth in the volume of traffic, but also considerable modernization of the fleet, and that in two basic directions:

a) elimination of steam propulsion and introduction of motor [diesel] tugs;

b) as diesel tugs were introduced, pushboat tows began to be introduced in the sixties.

3. From 1966 to the present time we have as a practical matter been confronted with stagnation in the development of river transport and indeed even with a cutback in its share of total traffic. This is manifested in the substantial drop in the share of our flag in carrying exports, transit traffic and traffic between foreign points, while only domestic traffic of crude building materials [rock products] has developed; and this mostly takes place within work organizations engaged in dredging and hydraulic engineering construction. There has also been a weakening of the position of river transport on the domestic market, and the only result that is somewhat better was achieved in carrying imports, which is a consequence of two favorable circumstances:

a) the considerable linkage of imports to the Danube and

b) conclusion of an agreement with the Soviet shipping company that the river shipping companies of the two countries will have equal shares in carrying imports.

	In Thousands of Ton-Kilometers						
Year	Total	Domestic	Exports	Imports	Transit	Traffic Between Foreign Points	In Millions [of Tons]
1939	2,866	2,146	308	327	85	--	951
1947	1,985	1,523	139	299	24	--	441
1952	3,093	2,646	286	147	--	14	716
1956	2,966	2,125	343	298	20	180	948
1960	5,563	4,078	561	621	123	180	2,010
1966	10,586	7,986	1,035	1,264	117	185	3,853
1970	15,675	12,523	596	2,278	183	95	4,384
1975	21,388	17,674	582	2,928	180	24	5,461
1980	25,990	23,246	304	2,209	183	48	4,974
1982	20,186	18,035	482	1,584	73	12	4,141

	Index Numbers						
Year	Total	Domestic	Exports	Imports	Transit	Traffic Between Foreign Points	In Ton-Kilometers
1980:1975	121.8	131.5	52.2	75.8	101.7	200.0	91.1
1980:1966	245.5	291.0	29.3	175.6	156.4	21.6	129.1
1982:1980	77.7	77.6	158.6	71.4	39.9	24.5	83.2
1982:1979	76.3	78.8	114.8	54.0	52.1	19.4	72.2

In the last 5-year period (1976-1980) there was a drop of 8.9 percent in ton-kilometers instead of a sizable increase, while at the same time the volume of traffic in tons increased 21.8 percent (which is also below the planning projections). This occurred primarily because of the appreciably larger share of traffic of building materials, which, as is well known, are carried over short distances.

At the same time, the volume of traffic in tons showed a differing behavior from type to type of transport, as follows:

i. domestic traffic was up 31.5 percent;

ii. imports were down 24.2 percent;

iii. exports were down 47.8 percent;

iv. transit increased slightly by 1.7 percent;

v. finally, traffic between foreign points was up 100.0 percent,

but, as is well known, small quantities were involved here.

These figures show the extent of the deviations from the planning projections:

i. over those 5 years domestic traffic increased 5.6 million tons (from 17.6 to 23.2 million tons);

ii. exports dropped from 582,000 to 482,000 tons;

iii. imports dropped from 2,928,000 to 2,219,000 tons;

iv. transit increased [original reads "declined"] from 180,000 to 183,000 tons;

v. traffic between foreign points rose from 24,000 to 48,000 tons.

The plan called for increases of all types of traffic in terms of both tons and ton-kilometers, which sufficiently demonstrates the extent of the divergence from the plan.

River transport's lag has been manifested still more strongly since 1965, that is, since introduction of the economic reform. Thus we note the following over the period from 1966 to 1980:

i. An appreciable increase of 15.4 million tons in the total volume of traffic, which to a considerable extent pertains to domestic traffic and further to building materials, while all other types of traffic declined except for imports and transit.

ii. The increase in terms of ton-kilometers was only 21.9 percent, which is altogether unsatisfactory.

Yet to some extent we still can be satisfied with the results in handling the volume of traffic all the way up to 1979, and including even 1980, when we compare this to the datum that in the first 2 years covered by the 1981-1985 plan there was a drastic drop in the volume of traffic, as shown by the figures below, which compare 1979, the year of the best traffic results, with 1982:

Indicator	Index Numbers [1982/1979]
Total traffic, in tons	76.3
Domestic traffic	78.8
Exports	114.7
Imports	54.0
Transit	52.1
Between foreign ports	19.4
Net ton-kilometers	72.2

There was a decline in total traffic and in all types of traffic except exports, though, of course, we should mention that the declines were manifested more sharply when the comparison is made to 1980.

These trends in recent years were influenced by the drop between 1978 and 1981 and the traffic carried by the JRB [Jugoslovensko recno brodarstvo--Yugoslav River Shipping Company], which was as follows:

Indicator	1978	1981	Index Number	Share, % 1978	1981
Domestic traffic					
Tons	1,984,499	1,929,024	97.2	39.8	57.8
Ton-kilometers	306,072	308,102	100.7	8.8	15.8
International traffic					
Tons	3,305,729	1,409,602	46.9	60.2	42.2
Ton-kilometers	3,180,518	1,643,821	51.7	91.2	84.2
Total traffic					
Tons	4,490,228	3,338,626	66.9	--	--
Ton-kilometers	3,486,590	1,951,923	56.0	--	--

Trends in the volume of traffic carried by the JRB have been influenced over the last 3 years by compounded adverse factors [original reads "consequences"], as follows:

i. the opening of the Yugoslav petroleum pipeline;

ii. stagnation in our country's economic development and international trade;

iii. the decline in capital investment activity;

iv. redistribution of traffic to the railroads and foreign river carriers.

One consequence of these adverse factors is manifested in the 2.8-percent drop of domestic traffic in terms of tons and the stagnation of traffic in terms of ton-kilometers (an increase of only 0.7 percent) over the last 3 years, while international traffic showed a drastic decline of 53.1 percent in terms of tons and 48.3 percent in terms of ton-kilometers, which had the decisive impact on the 33.1-percent decline of total traffic in terms of tons and 44-percent decline in terms of ton-kilometers.

These developments had the effect of increasing considerably the share of domestic traffic in total traffic (from 39.8 percent to 57.8 percent in terms of tons and from 8.8 percent to 15.8 percent in terms of ton-kilometers), while there was an appreciable drop in the share of international traffic in total traffic of the JRB (from 60.2 percent to 42.2 percent in terms of tons and from 91.2 percent to 84.2 percent in terms of ton-kilometers). It is significant that between 1980 and 1981 there was a drop in the volume of traffic for all types of cargo except ore, which is evidence of profound structural changes. Accordingly, it is not just a question of a decline in the volume of traffic of liquid cargo, though that was by far the most significant (1,614,000 tons and 460 million ton-kilometers), but also affected other cargoes (coal, metal, wood, building materials and miscellaneous). Thus the JRB has been turned toward ever greater rendering of services to

volume customers, such as the metallurgical combines in Smederevo, Skopje and Zenica, the chemical industry in Sabac, Prahovo, Pancevo and Obilic, as well as the refineries in Pancevo, Novi Sad and Bosanski Brod. Thus river transportation has been made directly dependent upon the development and operation of those facilities. How important is the impact of the development of some of them on the development of the JRB is best illustrated by the MKS [Smederevo Metallurgical Combine], which just in the first phase of its development called for about 4 million tons to be carried, in which connection it is pointed out that the present annual traffic capacity of the port at Smederevo is 700,000-800,000 tons per year, and the second phase of construction of the MKS necessitates carrying another 400 million tons, all of which, from the standpoint of river transportation, depends on construction of the Danube--Radinac Canal, since without those 9 km we cannot anticipate river transport's involvement because of the transshipment. Which makes it extremely important to build that canal so as to ensure that the iron ore is carried by sea and on the Danube, that ocean-going vessels up to 100,000 tons are unloaded at Constanta into vessels of the JRB. To that end the MKS is investing $35 million in iron ore mines in Guinea to ensure itself delivery of 1.2 million tons a year. The "Jugobrod" SOUR [Complex Organization of Associated Labor], which is already developing maritime operations, is taking part in this project. In any case, construction of this canal has very great importance to development of the JRB and the MKS regardless of the orientation of the MKS toward ore from Guinea, since the canal guarantees not only efficient supply of the ore and production supplies to the MKS from Guinea, but also from other sources (both domestic, such as ore from Prijedor, and foreign), as well as the shipping out of intermediate products and finished goods. Which is not even to mention the suitable circumstances for the location of manufacturing facilities along the Danube--Radinac Canal and the creation of an industrial and commercial complex.

The lag of river transportation is best seen if we eliminate domestic traffic from our consideration. Then we clearly note that the volume of traffic carried by our flag has been dropping in total international traffic, as shown by the table below.

In thousands of tons

Indicator	1965			1971			1975		
	Total	Exports	Imports	Total	Exports	Imports	Total	Exports	Imports
International river cargo traffic	1,875	849	1,026	4,615	981	3,634	5,868	1,240	4,628
Domestic flag	1,661	645	1,016	3,005	586	2,419	3,509	581	2,928
Foreign flag	214	204	10	1,610	395	1,214	2,359	659	1,700

Table (continued)

Indicator	1980 Total	1980 Exports	1980 Imports	1982 Total	1982 Exports	1982 Imports
International river cargo traffic	3,877	612	3,265	2,655	633	2,022
Domestic flag	2,509	304	2,209	1,986	405	1,581
Foreign flag	1,364	308	1,056	669	228	441

Share of the domestic and foreign flags in carrying international traffic (imports and exports) between 1965 and 1982, %:

Indicator	1965 Total	1965 Exports	1965 Imports	1971 Total	1971 Exports	1971 Imports	1975 Total	1975 Exports	1975 Imports
International river cargo traffic	100.0	100	100	100.0	100.0	100.0	100.0	100.0	100.0
Domestic flag	88.6	76	99	65.1	59.7	66.6	59.8	46.9	63.3
Foreign flag	11.4	24	1	34.9	40.3	33.4	40.2	53.1	36.7

Indicator	1980 Total	1980 Exports	1980 Imports	1982 Total	1982 Exports	1982 Imports
International river cargo traffic	100.0	100.0	100.0	100.0	100	100.0
Domestic flag	64.7	49.7	67.7	74.8	64	78.2
Foreign flag	35.3	50.3	32.3	25.2	36	21.8

The figures given above point to the following conclusions:

1. Total international traffic (exports and imports) experience a considerable growth all the way up to 1975, when the volume of traffic was 5.868 million tons as against 1.875 million tons in 1965. However, in 1980 international traffic fell to 3.877 million tons, and in 1982 to only 2.707 million tons. While in 1965 the share of the foreign flag was only 11.4 percent, its share rose to 34.9 percent in 1971 and to 40.2 percent in 1975, in 1980 it was slightly less (35.3 percent), and in 1982 it was only 25.2 percent.

2. Whereas in 1965 the share of the foreign flag was only 24.0 percent in the case of exports, it rose to 40.3 percent in 1971 and 53.1 percent in 1975, then fell off slightly in 1980 (50.3 percent), and in 1982 its share was 36.0 percent.

3. In 1965 the foreign flag had so to speak no share of imports, but in 1971 it already had a share of 33.4 percent, its share in 1975 was 36.7 percent, then it was slightly less in 1980 (32.3 percent), and in 1982 it amounted to

only 21.8 percent, which is a considerable improvement from our country's standpoint.

These figures indicate what substantial changes have occurred since the economic reform in 1965 with respect to the share of the foreign flag, changes which indicate the absence of a consistent policy to protect the interests of the domestic flag. This has led to adverse consequences which aside from leaving domestic river carriers unemployed, are also depriving the country of valuable foreign exchange (it is well known that river transportation shows a large surplus in net exchange transactions).

Average Distance Traveled by a Ton of Cargo in River Transportation (in km)

Year	Total	Domestic Traffic	Exports	Imports	Transit	Between Foreign Points
1966	364	141	907	1,040	1,444	163
1970	288	111	1,011	930	1,700	410
1975	255	113	955	930	966	458
1980	191	108	942	903	1,057	353
1982	205	116	1,004	927	1,164	416

The figures in the table above indicate the following:

1. We have an appreciable drop in the average distance traveled by the ton of cargo when we look at total river traffic from 364 km in 1966 to 288 km in 1970, 255 km in 1975 and only 191 km in 1980, and then there was a certain increase in 1982 (205 km). This means that the average distance was cut almost in half for total traffic over a period of 16 years. This occurred mainly because of the increase in domestic traffic, which grew from 8.0 million tons in 1966 to all of 23.2 million tons in 1980, and then in 1982 dropped to only 18.0 million tons. At the same time exports dropped off 771,000 tons, and traffic between foreign points dropped off 38,000 tons, while imports increased by 1.7 million tons and transit by 66,000 tons.

2. A drop in the length of the average haul is also recorded for domestic traffic itself, since it dropped from 141 km in 1966 to 108 km in 1980 and 116 km in 1982, approximating the average length of the haul in highway transportation by common carriers. This was brought about first of all by the fact that most of this traffic consists of crude building materials, which in 1965, say, had 54.9 percent of total tonnage, and in 1980 their share was all of 72.4 percent.

3. As for exports, the length of the average haul has shown an uneven development, resulting from the directions and structure of international trade, factors which river transportation is unable to influence, which indeed is also the case with the other types of traffic. That average haul was 907 km in 1966, in 1970 it increased to 1,011 km, and then since 1970 it has been gradually dropping off (955 km in 1975, 842 [sic] km in 1980, but in 1982 it was 1,004 km).

4. In 1966 the length of the average haul for imports was 1,040 km, in 1970 it dropped to 1,030 [sic] km, which is what it also was in 1975, in 1980 it dropped to 903 km, and there was a slight increase in 1982 (927 km).

5. Transit cargo is carried over long distance, so that in 1965 [sic] the average haul was 1,444 km, in 1970 it was all of 1,700 km, and then in 1975 it dropped to 966 km. In 1980 the length of the average haul was again on the rise and amounted to 1,057 km, and then in 1982 it dropped [sic] to 1,164 km.

6. As is well known, traffic between foreign points is carried for foreign customers on the upper Danube. In 1966 the length of the average haul was 163 km, in 1970 it climbed to 410 km, in 1975 it was 458 km, and in 1980 it dropped to 353 km, but in 1982 it rose again (416 km).

3. The Fleet

It is of interest to give the principal figures on the size and composition of the river fleet over the period 1970-1982.

Indicator	1970	1975	1980	1982
Diesel towboats, units	148	122	88	86
Pushboats, units	33	40	43	46
Self-propelled freighters and tankers, units	13	19	45	56
tons	7,031	12,343	39,804	48,309
Liquid-cargo and combined-cargo tow barges, units	126	130	133	112
tons	109,123	113,042	119,136	104,543
Dry-cargo tow barges, units	428	385	293	274
tons	263,110	240,252	183,968	171,192
Liquid-cargo push barges, units	46	49	48	48
tons	67,840	71,724	71,313	71,313
Dry-cargo push barges, units	123	190	222	228
tons	134,095	210,829	271,585	290,069

Indicator	Index Numbers		
	1982/1980	1982/1975	1982/1970
Diesel towboats, units	97.7	70.5	58.1
Pushboats, units	107.0	115.0	139.4
Self-propelled freighters and tankers, units	124.4	294.7	430.8
tons	121,4	391.4	687.1
Liquid-cargo and combined-cargo tow barges, units	84.2	86.2	88.5
tons	87.8	92.5	95.8
Dry-cargo tow barges, units	93.5	71.2	64.0
tons	93.1	71.3	65.1

Table (continued)

Indicator	Index Numbers 1982/1980	1982/1975	1982/1970
Liquid-cargo push barges, units	100.0	98.0	104.4
tons	100.0	99.4	105.1
Dry-cargo push barges, units	102.7	120.0	185.4
tons	106.8	137.6	216.3

A further process of restructuring the fleet occurred between 1970 and 1982, as follows:

1. A reduction of diesel towboats from 148 to only 86 units (a 41.9-percent drop).

2. An increase in the number of pushboats from 33 to 46 (39.4 percent), in which connection we should mention that the increase in the number of pushboats slowed down between 1975 and 1982.

3. Over the period from 1970 to 1982 there was an appreciable increase in the number of diesel freighters (from 13 to 55 [sic]) and in their capacity (from 7,031 to 48,309 tons), which was a consequence of the diversification of traffic and the orientation toward a self-propelled fleet (this is especially pronounced in SAP [Socialist Autonomous Province] Vojvodina.

4. At the same time there was first an increase in the capacity of liquid-cargo and combined-cargo tow barges over the period 1970-1980 (from 126 to 133 units and from 109,123 to 119,136 tons), while in the last 2 years (1980-1982) there has been a drop of these vessels to 112 units and 104,543 tons. If we examine the entire 12-year period (1970-1982), we see that the number of these vessels decreased by 14 and the tonnage by 4,580 tons (decreases of 15.8 percent in the number and 15.8 percent in the tonnage [neither percentage appears to be correct--translator's note]).

5. Appreciable changes have occurred with dry-cargo tow barges, whose number dropped all of 153 from 1970 to 1980, with a 92,000-ton drop in tonnage (which is a drop of 36.0 percent in the number and 35.9 percent in the tonnage). This decrease was especially pronounced over the period from 1975 to 1980.

6. At the same time, the withdrawal of dry-cargo tow barges from service had to be made up by building up-to-date dry-cargo push barges, whose number showed a stable growth up to 1980, and then over the two following years that development slowed down. Thus between 1970 and 1982 dry-cargo push barges increased by 105 units and 156,000 tons (85.4 percent in the number of units and 116.3 percent in terms of tonnage).

7. As for liquid-cargo push barges, there has been only a slight increase (from 46 units in 1970 to 48 units in 1982; the increase in the number was 4.4 percent, and the increase in tonnage 5.1 percent).

The makeup of the fleet with respect to age is as follows over the last 22 years:

Indicator	1960-1980	1940-1959	Up to 1939	Total
Pushboats	51	1	--	52
Towboats	104	70	48	222
Diesel freighters	41	1	12	54
Diesel tankers	7	2	2	11
Dry-cargo push barges	223	--	4	227
Liquid-cargo push barges	48	--	--	48
Dry-cargo tow barges	154	76	214	444
Liquid-cargo tow barges	41	39	41	121
Combined-cargo tow barges	11	3	10	24

The figures in this table show the following:

1. The pushboats were all built between 1960 and 1980, and only 1 was built slightly before 1960.

2. Among the towboats, 104 were built in the 1960-1980 period and can still be regarded as usable to some extent; 70 towboats are over 20 years old and not yet 39 years old and can be regarded as wornout, 48 of them are more than 48 years old and should be withdrawn from service as soon as possible because they are expensive to operate.

3. Most of the dry-cargo motor vessels were built between 1960 and 1980, only 1 is in the age group between 20 and 39, and 12 are over 40 years old and should be withdrawn as soon as possible from service for the reasons already given.

4. In the case of liquid-cargo motor vessels the major share were again built between 1960 and 1980, only 2 are in the age group between the ages of 20 and 39, and 2 have passed the 40-year age limit.

5. The dry-cargo push barges were all built in the 1960-1980 period, only 4 of them are converted vessels built 40 years ago.

6. The liquid-cargo push barges were all built between 1960 and 1980.

7. As for the dry-cargo tow barges, 154 were built in the 1960-1980 period, 76 are in the group between the ages of 20 and 39, and more than 214 of them are over 40 years of age and should be withdrawn from service for the reasons already given.

8. Among the liquid-cargo tow barges, 41 were built in the 1960-1980 period, 39 are in the group between 20 and 39 years old, and 41 have passed the 40-year age limit and should be withdrawn from service.

9. Of the 24 combined-cargo tow barges, 11 were built in the 1960-1980 period, 3 are in the group between 20 and 39 years old, and 10 are over 40 years old and should be retired from service.

Composition of the Fleet of Cargo Vessels Between 1970 and 1982 (in thousands of tons)

Indicator	1970	1975	1980	1982
Dry-cargo and liquid-cargo motor vessels	7,031	12,343	39,804	48,309
Liquid-cargo and combined-cargo tow barges	9,123	113,024	119,136	104,543
Dry-cargo tow barges	263,110	240,252	183,968	171,192
Total	379,264	365,637	342,908	324,044
Liquid-cargo push barges	67,840	71,724	71,313	71,313
Dry-cargo push barges	134,095	210,829	271,585	290,069
Total	201,935	282,553	342,898	361,382
Grand total	514,199	648,190	685,806	685,426

	Proportional Breakdown of Fleet			
Indicator	1970	1975	1980	1982
Total	100	100	100	100
Conventional vessels	74	56	50	47
Push-type vessels	26	44	50	53

The figures in this table indicate that over the period 1960-1980 there were substantial changes in the composition of the cargo fleet, and that in the direction of an increase in push-type and a drop in the share of conventional cargo capacity, as follows:

1. The capacity of dry-cargo motor vessels, liquid-cargo motor vessels and combined-cargo tow barges increased considerably in line with the ever greater demand to carry liquid cargo and also the greater demand to carry various cargoes in small quantities and over quite short distances, especially on the network of navigable canals.

2. At the same time there was an appreciable drop in the carrying capacity of dry-cargo tow barges from 263,110 tons to 171,192 tons, though we should mention that changes in that direction were more strongly manifested in the period 1970-1975 than in the period since 1975.

3. At the same time the capacity of dry-cargo push barges increased considerably from 134,095 tons in 1970 to 290,069 tons in 1982; this process was quite pronounced over the entire period from 1970 to 1980, with a slower growth in the 1980-1982 period.

In line with these developments, the share of the cargo capacity of conventional [tow-type] vessels dropped from 74 percent in 1970 to only 47 percent in 1982, while the share of push-type vessels increased from 26 percent in 1970 to 53 percent in 1982.

We will examine utilization of the fleet according to figures covering the period from 1970 to 1982 and including both river and lake transportation.

Year	Total Cargo Carried, thousands of tons	Millions of Ton-Kilometers	Capacity, thousands of tons	[Traffic Per Ton of Capacity] In Tons	In Ton-Kilometers
1960	5,563	2,009	368	15	5,459
1970	15,675	4,384	581	27	7,546
1975	21,388	5,461	642	33	8,506
1980	25,990	4,975	686	38	7,252
1982	20,186	4,141	685	30	6,453
Index Number					
1980:1960	467.0	248.0	186.0	253.0	133.0
1980:1975	122.0	91.0	107.0	115.0	85.0
1982:1980	77.7	83.2	99.9	79.0	89.0
1982:1975	94.4	75.8	125.4	90.9	75.9
1982:1960	362.9	206.2	186.1	200.0	118.2

1. Over the 20-year period from 1960 to 1980 the volume of traffic in tons increased from 5.6 in 1960 to 26.0 million tons in 1980 (or 267 percent), while traffic in ton-kilometers increased from 2.0 billion in 1960 to 4.9 billion in 1980 (or 148 percent). However, in the period 1980-1982 the volume of traffic in tons dropped off 22.7 percent and traffic in net ton-kilometers dropped off 16.8 percent.

2. Over the 5-year period 1975-1980 the volume of traffic in tons increased from 21.4 million tons in 1975 to 26.0 million tons in 1980 (or 22 percent), while traffic in ton-kilometers was off 9 percent, and the length of the average haul dropped from 255.3 to 191.4 km over those 5 years. However, between 1975 and 1982 the volume of traffic in tons dropped 5.6 percent and in net ton-kilometers it dropped off all of 24.2 percent, which is a consequence of the shorter length of the average haul.

3. As to the utilization of capacity, we should emphasize that exceptional progress was made in the period from 1960 to 1975, while over the period 1975-1980 productivity was stagnant or even dropped off, especially in the period 1980-1982, thanks to the operation of the following factors:

i. elimination of steam propulsion and its replacement by diesel propulsion (tugboats);

ii. the transition from towboats to the pushboat system, which made propulsion still more efficient and considerably improved productivity;

iii. two-pronged modernization of the cargo fleet (increasing the size of dry-cargo tow barges and construction of dry-cargo push barges);

iv. improved technical capability of vessels for navigation at night and under unfavorable weather conditions;

v. construction and modernization of port, cargo-handling and storage facilities;

vi. considerable improvement of conditions for navigation through the Djerdap gorge and on certain other waterways (the Tisa and the Danube-Tisa-Danube Hydrosystem), though on numerous waterways the situation is the same or has deteriorated further, especially on the Sava, the Drava, the Begej, etc.

Among the adverse factors which have influenced the productivity of capacity, we should mention the following:

i. the considerable increase in the share of domestic traffic in total river traffic and also the drop in certain types of international traffic (exports, traffic between foreign points, and transit traffic);

ii. unevenness over time and influence of the seasons on the dynamic pattern of traffic;

iii. geographic unevenness (considerably greater traffic upriver than downriver), etc.

4. In 1980 38 tons of traffic were carried for each ton of capacity, while in 1960 this figure was only 15 tons (an increase of 153 percent), but that growth considerably slowed down in the period from 1975 to 1980 and amounted to only 15 percent (from 33 tons in 1975 to 38 tons in 1980). In 1982 productivity continued to drop, so that only 30 tons of traffic were carried per ton of capacity, as against 38 tons in 1980 (a drop of 21 percent).

5. As for ton-kilometers, the growth of the productivity of capacity was slower than it was for tons, and over the 20-year period (1960-1980) amounted to only 33 percent (from 5,459 ton-kilometers in 1960 to 7,252 in 1980).

By contrast with the constant process in the rise of productivity of capacity measured in tons, in the case of ton-kilometers this process was noted up until 1975, but from that time to 1980 there was a 15-percent drop in the number of ton-kilometers per ton of capacity (from 8,506 ton-kilometers in 1975 to 7,252 ton-kilometers in 1980). This drop was manifested to a still greater degree in the period 1980-1982, since in 1982 the figure was only 6,453 net ton-kilometers, as against 7,252 in 1980 (a drop of 11 percent).

6. A general conclusion can be drawn to the effect that cargo capacity has been considerably better utilized in terms of tons carried than in terms of ton-kilometers, which over the last 7 years has shown a considerable drop in utilization because of the impact of the following factors:

i. the drop in the length of the average distance traveled per ton of cargo because of the steady increase in the traffic of building materials (sand, gravel and stone) on the one hand and the drop in international traffic on the other;

ii. the long idle time of cargo capacity during loading and unloading;

iii. the waiting of loaded vessels en route (reformation of pull tows and push tows).

7. In making this analysis we should mention that the turning point in development of river transportation began in 1978, since that is the last year when an increase in the overall volume of traffic was recorded, and since then we have had a retreat, as follows:

Year	Tons	Net Ton-Kilometers
1978	26,492	5,907
1979	26,444	5,734
1980	25,990	49,975
1982	20,186	4,141
Index Number		
1982:1978	76.2	70.1

This means that the loss over the period of 4 years has been 6.306 million tons and 1.427 billion net ton-kilometers.

It is easy to conclude from no more than this that an adverse tendency was manifested over the last 2 years of the last 5-year plan. To this we should add a significant new element, which is activation of the Yugoslav petroleum pipeline at the end of 1979, when river carriers lost sizable quantities of liquid fuels imported from the Black Sea Basin. There was also a sizable drop in the traffic of crude building materials because of the decline in capital investment activity. Now that we are talking about this, we feel that we should emphasize the lack of preparedness and organization not only on the part of our river carriers, but also their customers, and indeed public entities, which should have taken appropriate measures to protect the interests of our river fleet. This concerns, above all, the petroleum imported from the USSR, which, at least concerning that portion which our fleet is entitled to carry (i.e., about 50 percent) should, judging by all factors, continue to be carried by river rather than the pipeline (this is crude petroleum for the refineries in Pancevo, Novi Sad and Bosanski Brod). The author of this article made an offer in good time, i.e., before the pipeline was put into operation, to make an expert economic evaluation of the justifiability of shifting that traffic to the pipeline for the appropriate authorities (Economic Chamber of Yugoslavia and so on) and to provide a definitive answer as to the economic justifiability of that shift. However, initiatives of that kind were not taken up, and the adverse developments occurred to put river carriers (the JRB and DL [Dunavski Lloyd--Danube Lloyd's] as well as certain others) (loss of cargo and the need to restructure their fleets).

The author of this article raised this issue in a study of the Transportation Institute,[1] pointing out that "this set of problems should be examined in connection with putting the petroleum pipeline into service," but nothing came of that.

This problem has been treated in more detail in a study of the Institute of Transportation Economics in Belgrade,[2] which states on p 277:

"When we take up the question of the oil pipeline, we should mention one other problem, and that is the disproportionate development of capacity for carrying liquid cargo in river shipping, since the very rapid shift of the carrying of petroleum to the pipeline has placed river carriers (especially the JRB of Belgrade) in a very difficult situation. This is yet another piece of evidence of our doing things without planning and the absence of a coordinated approach to large undertakings, which certainly should be avoided in every way in the future." A footnote on the same page has this to say about the same problem:

"The carrying of petroleum in our vessels from the Black Sea on the Danube would in all respects seem to be economically more justifiable than the roundabout transport from that area to Omisalj on Krk by foreign vessels and then by pipeline to Pancevo and Novi Sad, and this ought to be investigated in more detail."

The JRB of Belgrade, our largest river carrier, sent to the appropriate authorities a letter registered as VII/3-1 No 2670, dated 14 April 1980, related to employment of the tanker fleet, in which the tanker capacity of the JRB is shown to be as follows:

72 liquid-cargo tow barges with a tonnage of	61,198
42 liquid-cargo push barges with a tonnage of	62,340
114 tanker barges with a tonnage of	123,338

The portion of that fleet that was employed in carrying crude petroleum from Reni to Pancevo Opatovac and from Cerna voda to Pancevo was as follows:

42 liquid-cargo push barges with a tonnage of	62,340
20 liquid-cargo tow barges with a tonnage of	15,000
62 tanker units with a tonnage of	77,340

This traffic employed 6 pushboats and towboats with a total power of 14,000 HP. The capacity of Dunavski Lloyd of Sisak was as follows:

45 liquid-cargo tow barges with a tonnage of	40,000
6 liquid-cargo push barges with a tonnage of	10,200
51 tanker units with a tonnage of	50,200

The portion of this fleet involved in carrying crude petroleum from Reni to Opatovac was 7 liquid-cargo tow barges with a tonnage of 5,300 and 6 liquid-cargo push barges with a tonnage of 10,200, as well as tugboats with a capacity of about 6,000 HP. In all, about 500 workers were employed on these vessels.

In recent years the crude petroleum traffic carried by the JRB has held steady at about 1.2 million tons. For example, in 1979 traffic was as follows by routes:

Cerna voda--Pancevo	1,043,000 tons
Reni--Pancevo	118,000 tons
Reni--Opatovac	59,000 tons
Total	1,220,000 tons

The capacity of Dunavski Lloyd in an average year was about 200,000 tons on the Reni--Opatovac route, but in 1979 245,000 tons were carried.

Revenues from carrying crude petroleum in 1979 amounted to 34.2 percent of the revenues of the OOUR [Basic Organization of Associated Labor] "River Transport" of the JRB and 18 percent of the revenues of the OOUR "River Transport" of the DL.

It goes on to say that the maritime shipping rates over the distance from Novorossiysk to Omisalj when tankers with a capacity of about 60,000 tons are chartered were 9.74, and shipping rates at the time this document was submitted ranged between 6 and 8 per ton of crude petroleum, depending on the size of the tanker. The Danube shipping rate between Reni and Pancevo is 9.44 clearing dollars, and between Reni and Opatovac 9.79 dollars. We should mention at the same time that the prices for this transport are subject to change because of supply and demand, prices of fuel and other conditions, while the prices of river transport are stable. Consequently, the river rates are about 3 dollars per ton more expensive, but it is expected that the rates will even out in the foreseeable future or even that the maritime rates will be higher.

Aside from rates, which are certainly an important element in determining the utilization of a particular branch of transportation, we should mention that the experience of foreign and our own customers has shown that two or even more transportation routes are used for the supply of goods. In order to guarantee transport, here shipping rates are neglected to some extent, since a stoppage of production, which could result from an interruption of transport, would cause damage out of proportion to the somewhat higher shipping costs. This especially applies to extraordinary conditions which are possible in certain areas. Aside from that the Work Organization "Jugotanker" of Zadar is the only maritime carrier of crude petroleum which has the capacity to carry the approximately 3.5 million tons of crude petroleum between Novorossiysk and Omisalj and the same quantity from the Iraqi port of Baniyas to Omisalj. That means that foreign carriers must be left about 6 million tons of crude petroleum, since imports of crude petroleum are ranging at a level of about 12 million tons, and about 42 million dollars are set aside for transport. Consequently, instead of foreign maritime carriers, up to about 1.5 million tons of crude petroleum might be carried by river, mostly in our own vessels, which would even afford a foreign exchange savings of about 10.5 million dollars.

On the basis of the presentation of the situation by the JRB of Belgrade and the DL of Sisak, measures were proposed which should mitigate the serious consequences which have resulted from shifting the transport of all the crude petroleum from the Black Sea Basin for our refineries, as follows:

1. during 1980 withdraw 45 liquid-cargo tow barges from service and the corresponding towboat capacity;

2. during 1980 and subsequent years adapt between 8,000 and 10,000 liquid-cargo push barges to carry dry cargo;

3. obtain additional liquid cargo on the international Danube transport market in order to employ 10,000 tons of cargo space;

4. propose to the competent authorities and also to users of transport services that during 1980 and subsequent years they import about 800,000 tons of crude petroleum to be carried on the Danube waterway in order to employ the fleet of the JRB and the DL.

If these proposals are not accepted, the tanker fleet of the JRB and the DL will be scrapped or sold, which in the future would be harmful to the country's economy.

FOOTNOTES

1. "Projection of the Development of Transportation in Yugoslavia's Medium-Term Development Plan Covering the Period 1981-1985," by Dr M. Dokic, professor, Prof F. Josifovic and engineer M. Popov, Transportation Institute of the IKS [further expansion unknown], Belgrade, April 1980.

2. "Development of Yugoslavia's Transportation and a Long-Range Conception up to the Year 2000," Vol II, by Dr S. Novakovic, professor, and coauthor Dr M. Dokic, professor, who did that part of the study, Belgrade, 1981.

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DATA ON MONTENEGRIN ECONOMY, DEBT STATUS, OUTLOOK

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 24-26 Mar 84 p 5

[Article by Velimir Tasic: "The High Price of Initial Development"]

[Text] Initiation of the broad discussion of the conditions and potential of Montenegro's long-range development up to the year 2000 has been a suitable occasion for numerous analyses, studies, projections and other analytical material, on which practically all scientific and other institutions in the relevant fields have been involved, to make overall examinations and assessments of the development to date as well as of the price which has been paid for that. That kind of examination cannot avoid the extremely low economic base from which the start was made, and the major share of postwar development is judged to be initial development, with all the disproportions which are dominant even today in the structure of the Montenegrin economy. Could they have been avoided and to what extent--in the light of the conditions and circumstances of the boundaries within which development policy has been formulated and the specific decisions made?

The basic and very noticeable characteristic of Montenegro's economic development to date is its orientation toward building facilities which have importance not only to this republic, but indeed to the economy of the country as a whole. Most of the capital from domestic sources and also the largest amounts of foreign credits were spent to build the "Boris Kidric" Steel Mill in Niksic, the Titograd Aluminum Combine, the Bar-Belgrade railroad and the port at Bar, construction of the "Perucica" and "Piva" Power Plants and the "Pljevlja" Thermal Electric Power Plant, bauxite, coal, lead and zinc mines, development of the tourist industry, construction of major highways (the Adriatic Highway), and development of the maritime industry.

Of the total foreign debt, which at the end of 1983 amounted to $860 million, these organizations and activities accounted for more than $614 million, while all other economic and noneconomic entities in the republic accounted for the other $246 million. The largest obligations under foreign credit are those of the Titograd Aluminum Combine ($149.8 million), the steel mill in Niksic ($124.4 million), the "Pljevlja" Power Plant ($57.9 million), "Jugooceanija" of Kotor ($60.9 million), the republic self-managed community of interest for highways ($54.2 million), the Port of Bar ($49.4 million), the Titograd Railroad Transportation Organization ($35 million), the "13th of

July" Agricultural Combine of Titograd ($31.2 million), the Montenegrin Electric Power Industry of Niksic ($40.4 million), the Niksic Bauxite Mines ($15.7 million), the Pljevlja Coal Mine ($14.4 million), the "Radoje Dakic" Construction Machine Industry of Titograd ($51.6 million).

Capital Committed to Priorities

The list of foreign credits vividly indicates that foreign capital has been used to the greatest extent and above all to build facilities related to strategic raw materials, the fuel and power industry, the transportation infrastructure, to develop the tourist industry and the maritime industry. Better stated, most of the foreign capital has been used in previous years to develop activities which over Yugoslavia's entire postwar development, and indeed even today, have been and are of particular importance to the country as a whole. This is a fact which cannot be sidestepped in an assessment of the purposiveness with which the foreign credits have been used. Nor the fact that in the period of intensive capital investment (1965-1980), and especially during the last 5-year period, it was not easy to obtain domestic financed capital. That was not the case on the world capital market, credits were offered on favorable terms and conditions, especially when it came to delivery of equipment and technology. Quite a bit of foreign capital, however, was also used to pay domestic contractors, equipment suppliers and for other purposes which can hardly be justified from our present vantage point. However, that was not a behavior specific only to investors in this republic.

It is understandable that with such high indebtedness an answer is also being sought to the question of what results have been achieved in development and are they in proportion to the capital invested. As for investments in Montenegro over the period 1966-1980, it needs to be said that aside from the foreign capital, sizable funds from domestic sources were also used. Resources from the Federal Fund for Faster Development of the Underdeveloped Republics and Provinces was the most important and best-quality source of investments for Montenegro as an underdeveloped republic, and in terms of size it was the dominant source. These resources are one reason why Montenegro's socioeconomic development has by and large achieved the rate set forth in development programs. Over the period 1966-1980, for instance, the social product of the entire economy rose at an average annual rate of 6.1 percent and in 1980 was 2.4-fold greater than in 1966 [original reads "1976"]. Investments in fixed capital in the socialized sector of the economy and noneconomic activities increased at an average annual rate of 8.2 percent, employment at a rate of 3.9 percent, and labor productivity at a rate of 2.8 percent. The most dynamic development was achieved in the period 1976-1980, when the average annual growth rate of the social product was 8.4 percent and the growth of investments in fixed capital was 13.8 percent. This kind of development also guaranteed the increase in the per capita social product (in 1972 prices) from 6.967 in 1965 to 13.596 dinars in 1980 and a rise from 76.5 percent of the Yugoslav average to 79.6 percent. The labor force participation rate rose from 14.35 in 1965 to 21.73 in 1980 and the republic's standing relative to the national average rose from 77.8 to 85.3 percent.

The dynamic pattern of economic development is also well-illustrated by comparative figures on the volume of production in certain of the more important economic facilities in 1965 and the plan for 1985.

Product	Unit of Measurement	1965	1985 (plan)
Electric power	gigawatt-hours	865	3,020
Coal	thousands of tons	495	2,500
Raw steel	thousands of tons	158	400
Bauxite	thousands of tons	272	800
Raw aluminum	thousands of tons	--	100
Alumina	thousands of tons	--	280
Lead-zinc ore	thousands of tons	139	500
Sea salt	thousands of tons	27	75
Cement	thousands of tons	--	320
Paper	thousands of tons	17	40
Bricks	millions	14	120
Beer	thousands of hectoliters	82	750

The Dilemmas Remain

Understandably, this kind of dynamic economic and overall development of Montenegro has also had its other side.

All these dilemmas were also reflected when the dimensions of Montenegro's foreign economic relations for 1984 were being established in the Resolution and still more when organizations of associated labor were adopting their export-import plans. The Resolution envisaged that total exports of goods and services would increase about 16 percent and those to the convertible area 20 percent. The point of departure was that this volume of exports of goods and services was a precondition for invigorating economic activity and carrying out the policy of economic stabilization.

The economy, however, committed itself to still more ambitious plans, so that exports are to increase 34 percent, including a 43-percent increase in export of goods, while revenues from services would increase 16 percent. In that way gross revenues from exports of goods and services this year are supposed to reach $415 million, $295 million of this on the convertible market. In that way the value of planned imports would be entirely covered by exports of goods and services.

An Enduring Effort

The permanent remedy for unstable flows in the economic activity of organizations of associated labor in Montenegro and the way to equip the economy to painlessly discharge its above-average obligations abroad are seen to lie above all in a higher level of utilization of existing production and service capacity and in an augmentation of other qualitative factors in the conduct of economic activity. Understandably, there are also objective obstacles to fuller utilization of certain capacities--the shortage of electric power and

other energy, raw materials and production supplies, the slack demand for certain products on the domestic and foreign markets, and so on. To a greater or lesser degree difficulties of that kind must also be taken for granted in the future as well.

Nevertheless, the internal potential is quite evident and significant in its size. The very fact that average capital employed per worker (in 1981) is one index point higher in Montenegro than the national average, while indebtedness is almost twice as high, and the income earned per worker is at the same time about 15 percent lower, reproductive capability almost 20 points lower, accumulative capability 48 points lower, and the ability to reinvest all of 70 percent lower, constitutes a warning that calls for a strong, targeted and enduring effort.

To be sure, these unfavorable indicators are in part a reflection of problems in the system which have not been resolved (primary distribution and so on), but the fact remains that Montenegro's largest potential for foreign exchange, a potential which can be used for development in the coming period at a far lower price than the price of foreign capital, lies in the existing economy, but also in those untapped resources in agriculture, small business and other sectors.

[Box, left column]

Hastiness

If there is no consensus in the Montenegrin public about whether particular economic projects built in the previous period can be put on the list of mistaken investments or not, opinions are undivided concerning the "median" board [presumably a fabricated wood building material] factory in Ivangrad. This has been an utter failure, and that is also true of a majority of similar factories in other parts of the country.

The desire to round out the wood processing complex at Ivangrad with this kind of plant rather than others still has quite a few technological unknowns even for far more advanced countries, the investment project was entered into hastily and with a high share of foreign credit. All the attempts to establish an economically justifiable production in this factory has failed. In the meantime obligations to foreign creditors have multiplied and reached the amount of about 2 billion dinars. It is understandable that this item, which is not small, is a burden on Montenegro's overall obligations abroad.

[Box, upper center]

This Year and Next Year Will Be Two Exceedingly Difficult Years

Montenegro's foreign debt as of 31 December 1983 was $860 million. Of that, $774.6 million came from the convertible area and $113.4 million from the bilateral payments area. Medium-term and long-term financial credits make up $487.9 million of the total debt to the convertible area, $225.5 million have resulted from equipment imported, and $31.2 million represent production

supplies. Short-term credits constitute only $2 million in the total debt. As for the debt to the bilateral payments area, it consists of medium-term, long-term and finance credits, in the amount of $10.4 million, and equipment in the amount of $103 million.

By comparison with the debt at the end of 1983, with payments made during 1983 of $77.9 million against principal and $82.9 million in interest, while new credits were taken in the amount of $86.9 million, the basic debt at the end of 1983 was up $9 million.

Yet the total obligations of the Montenegrin economy to make payments (principal and interest) on credits concluded before 31 December 1983, assuming the rate of exchange of 124.80 dinars for 1 American dollar, amount to $1,433.7 million. In this, payment against principal would be $969.3 million and interest would be $464.4 million.

It is assumed that this year and next year will be especially difficult for making the credit payments. That is, in 1984 obligations coming due amount to $245.3 million, and in 1985 they amount to $222.5 million. In the years after 1985 the debt remaining to be paid in annual installments is $900.2 million.

At the end of 1983 unused credits amounted to $128.5 million, in which credits of international financial organizations represent 56 percent.

[Box, lower center]

Differences in Rates of Exchange Have Almost Tripled the Size of the Debt

The figures for 17 work organizations which account for over 80 percent of the total foreign debt of the Montenegrin economy show that the total amount of their debt was 14,416 million dinars at the rate of exchange in effect on the day when the foreign loans were taken. As of 31 August 1983 6,698 million dinars of that, or 46.5 percent, had been repaid. However, because of differences in rates of exchange, on that same day these work organizations owed 40,755 million dinars on those same credits, almost threefold greater than the original debt.

[Box, right columns]

The "Dream Railroad" Has Been Forgotten

Though we often hear critical comments to the effect that we design quickly, but build slowly, and that this is one of the principal reasons for bad investments, when it comes to the Belgrade-Bar railroad and the Port of Bar, this kind of reproach is out of place. Many studies were written, many projects carried out and not a single possibility neglected concerning the importance of this transportation complex over some 10 years. It was referred to with good reason as the "dream railroad," since the ideas about its construction arose 100 years ago and have been passed on from generation to generation. The railroad was finally completed in 1976. The port at Bar was built

at the same time with a capacity of handling about 5 million tons of cargo a year. Need we say how much capital was spent on these projects?

Now, however, that the time has come to celebrate and when millions of tons of freight ought to be moving along this transportation artery (whose capacity is about 9 million tons a year), it is being utilized far below its capability. The same is true of the Port of Bar. Last year about 1.7 million tons of cargo were transshipped, only a third of its capacity was utilized, in this our southernmost and thereby also economically most attractive "gateway" to the world.

What are the reasons for this? Do they lie in the unnatural demarcation by republic and other boundaries of this system which is unified in its engineering and technology and which on the basis of economic logic begins, if no further, then immediately in the Port of Belgrade, and ends in the Port of Bar?

The difficulties confronted by the users and managers of this transportation system arise in large part, if not mostly, from underutilization of the capacity of the railroad and the port. These difficulties, however, would seem to be operating in the opposite direction from the logical one, which would be to enter into association and to energetically break down all the unnatural barriers established in the illusory hope that a way out of the economic difficulties will be found by setting oneself apart.

It is clear here that the obligations coming due to foreign creditors (the Titograd Railroad Transportation Organization and the Port of Bar owe more than $80 million) are taking on a new dimension in the assessment, a dimension which cannot be disassociated from the demand that an effective way be found out of a situation which has put a burden on the life and work of several thousand workers in the organizations which are managing this extremely important and technologically indivisible transportation complex.

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